

# **ENVIRONMENTAL ASSESSMENT**

## **GREAT FALLS COAL FIELD CLOGGED STREAMS ABANDONED MINE LANDS PROJECT CASCADE COUNTY, MONTANA**



**Prepared By:  
Montana Department of Environmental Quality  
Mine Waste Cleanup Bureau  
Abandoned Mines Land**

**May 2012**

## TABLE OF CONTENTS

CHAPTER 1 – INTRODUCTION	3
A. PURPOSE AND NEED FOR THE ACTION	3
B. PROJECT BACKGROUND/GENERAL INFORMATION	3
C. PROJECT LOCATION	5
D. PREVIOUS RECLAMATION ACTIVITIES AND INVESTIGATIONS	7
CHAPTER 2 – DESCRIPTION OF THE ALTERNATIVES	9
A. OTHER ALTERNATIVES CONSIDERED BUT REJECTED FROM FURTHER ANALYSIS	9
B. RECOMMENDED ALTERNATIVE	9
CHAPTER 3 – THE AFFECTED ENVIRONMENT	11
A. GENERAL SETTING	11
B. CRITICAL ELEMENTS	13
CHAPTER 4 – ALTERNATIVES’ ENVIRONMENTAL CONSEQUENCES	18
A. ALTERNATIVES NOT SELECTED	18
B. RECOMMENDED ALTERNATIVE	20
CHAPTER 5 – CONSULTATION AND COORDINATION	20
A. PERSONS, ORGANIZATIONS, AND AGENICES CONTACTED	20
B. PREPARERS AND REVIEWERS	21
CHAPTER 6 – REFERENCES	21
Appendix A- Maps of Proposed Work Areas, Identifying Affected Landowners.....	23
Appendix B- Plan and Profile Sheets.....	26
Appendix C- Cross-Sections Corresponding to Plan and Profile Sheets.....	38
Appendix D- Details of Typical Cross-Sections.....	46
Appendix E- Copy of State Historic Preservation Office Consultation.....	48
Appendix F- Montana Fish, Wildlife, and Parks Findings.....	50
Appendix G- April ‘11 Road Log with Montana Department of Transportation Personnel.....	54
Appendix H- Laboratory Results and Chemical Analyses from Samples taken.....	63
Appendix I- DEQ Water Protection Bureau Correspondence.....	84
Appendix J- US Army Corps of Engineers Correspondence.....	87
Appendix K- Montana Department of Transportation Permit.....	90
Appendix L- Cascade County Floodplain Permit Decision.....	92

## CHAPTER 1 –INTRODUCTION

### A. PURPOSE AND NEED FOR THE ACTION

The Montana Department of Environmental Quality (DEQ), Abandoned Mines Bureau (AMB) has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and relevant Federal and State laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives.

The AMB and Cascade County have investigated and evaluated the need for removing precipitated metals and sulfates from the ditches and streams adjacent to or within the communities of Sand Coulee, Stockett, and Tracy. These precipitates are resultant from historic mining activities in the area. Hundreds of tons of dissolved metals and sulfates are discharged annually from these abandoned coal mines into Sand Coulee, Straight, and Cottonwood Creeks, in addition to their adjacent, tributary ditches (Figure 1):

		average	tons/yr	tons/yr	tons/yr	lbs/yr	lbs/yr	lbs/yr	lbs/yr	lbs/yr
Stream	Site	gpm	Fe	SO <sub>4</sub>	Al	Cd	Cr	Mn	Ni	Zn
Cottonwood Ck	Cottonwood #6	22	38	297	20	8.3	4.8	231	1062	4966
Cottonwood Ck	Cottonwood #2	9	27	258	23	12.0	5.1	334	496	2486
Cottonwood Ck	Centerville	9	5	59	4	1.0	0.7	56	31	88
#5 Coulee	Giffen Spring	220	37	351	6	6.7	3.9	370	356	1426
Sand Coulee	Mining Coulee	9	21	194	18	3.3	12.4	133	308	1326
Sand Coulee	Kates Coulee	31	20	186	11	1.1	4.5	171	211	837
Sand Coulee	Straight Coulee	13	10	89	7	1.8	4.7	76	140	608
	totals	314	159	1434	89	34.2	36.2	1371	2603	11737

Figure 1- Average annual tonnage of impacted materials within defined waterways.

These discharges have killed soil stabilizing vegetation, clogged and destabilized infrastructure, including bridges and culverts, and have aggraded stream channels and tributaries. This has resulted in the above waterways flooding out of their banks.

### B. PROJECT BACKGROUND/PROJECT LOCATION/PREVIOUS INVESTIGATIONS AND RECLAMATION ACTIVITIES

#### **BACKGROUND**

The Great Falls Coal Field was recognized as the State's premier Coal Field, with production levels exceeding that of all other combined coal fields within the State from the 1880s through the early 1900s.<sup>1</sup> Its medium-grade bituminous coal occurs at the top of the Morrison Formation. Coal deposits for the region average 8½ feet in thickness. Coal from the Great Falls Coal Field contains a high percentage of sulfur, occurring in the form of iron-pyrite nodules. This sulfur accounted for approximately 3% of the coal

<sup>1</sup> Rossillon, Mitzi, Mary McCormick, and Mark Hufstetler, "Great Falls Coal Field: Historic Overview." Prepared for the Department of Environmental Quality, Abandoned Mine Lands Program by Renewable Technologies Inc. Butte, Montana: 2009.

volume mined and, together with water found in underground workings, contributes to cause Acid Mine Drainage (AMD) found in waterways in and around the towns of Sand Coulee, Stockett, and Tracy. The majority of coal mining activities were conducted by or at the behest of two (2) companies, the Great Northern Railway Company and the Anaconda Copper Mining Company.<sup>2</sup> Activities conducted at various coal mines throughout the area employed hundreds of workers.<sup>3</sup>

Coal mining activities began to greatly diminish as industry and residential dependence on coal declined, forcing the closure of many of the areas' coal mines. The final coal mine in the Great Falls Coal Field to close was the Giffen Mine, which ceased production in 1947; however, the majority of coal mines in this area ceased operations much earlier in the 20<sup>th</sup> century.<sup>4</sup>

The legacy of mining in the Great Falls Coal Field transformed the culture and physical appearance of the region. Remnants of historic mining activities can still be seen in Sand Coulee, Stockett, and Tracy. Although the population of these towns has drastically decreased since the zenith of mining activities at the turn of the 20<sup>th</sup> century, the impacts of historic mining can be witnessed in contemporary times via the continuous denigration of the local environment. Water well contamination is not uncommon in this area, and the waterways that flow through these towns are constantly impacted by metals precipitates flowing from abandoned coal mines. This has resulted in rust-colored water, incapable of supporting biotic life.

The detrimental impacts resulting from the spread of this impacted water are the focus of this Environmental Assessment. The precipitates released from these mines undergo a fluvial transfer from mines within the region through area waterways en route to the Missouri River. These precipitates have settled along the entirety of ditches and waterways in this region. The accumulation of these precipitates within confined spaces, such as beneath bridges and within culverts, is a particular problem. As these features become clogged with precipitates, they become incapable of transferring water downstream. This has resulted in numerous instances of flooding, wherein water is unable to pass beneath bridges or through culverts. The impacted water therefore accumulates at the entrance to these features, until it reaches a level that permits it to travel an alternate route, out of the streambed or ditch channel.

This occurrence has resulted in numerous instances wherein impacted waters have flooded onto private land, denuding these parcels of all vegetation and creating environmentally sterile grounds. Other occurrences of flooding have resulted in State and Cascade County roadways becoming inundated with stream and ditch overflow. This serves to create a danger to travelers along these routes and has necessitated road repairs on a frequent basis.

---

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.

<sup>4</sup> Ibid.



## PROJECT LOCATION

Precipitates that are to be addressed by this project are located in Sand Coulee Creek, Straight Creek, Cottonwood Creek, and their unnamed tributaries and ditches.

Investigation and reclamation activities will occur in Township 19N, Range 4E, Sections 12, 13, 14, 23, 25, 36, as well as in Township 19N, Range 5 E, sections 19 and 30 (See Appendix A, which displays the geographic location of proposed work areas). The western portion of reclamation activities addressing the removal of precipitates will occur in the town of Tracy, south along E. Hunter Road, into the town of Sand Coulee. The project's eastern activities will occur from just south of the town of Centerville, along State Route 227, to the town of Stockett. Activities will also include an area 1.57 miles east of Stockett adjacent to Cottonwood Coulee Road.

Access to the sites that are proposed for reclamation include: private land, Cascade County Rights-of-Way, and State of Montana Department of Transportation Rights-of-Way. The following lists the approximate locations of reclamation activities:

- Western portion of activities (Tracy south to Sand Coulee) –
  - The southwestern corner of Township 19 North, Range 4 East, Section 12 (beneath the Blaine Street Bridge in Tracy, traveling south along East Hunter Road)
  - Township 19 North, Range 4 East, Section 13 (adjacent to East Hunter Road)
  - The northeast corner of Township 19 North, Range 4 East, Section 23 (adjacent to East Hunter Road)
- Eastern portion of activities (south of Centerville to Stockett) –
  - Township 19 North, Range 5 East, Section 19 (adjacent to State Route 227)
  - The northwest corner of Township 19 North, Range 5 East, Section 30 (adjacent to State Route 227)
  - The eastern half of Township 19 North, Range 4 East, Section 25 (adjacent to State Route 227)
  - The northeastern half of Township 19 North, Range 4 East, Section 36 (adjacent to State Route 227 and into the town of Stockett)
  - The southeastern corner of Township 19 North, Range 4 East, Sections 36 and 31 (east from the town of Stockett 1.57 miles adjacent to Cottonwood Coulee Road)

**Site Access** – Access to all sections of waterways and/or ditches that will be reclaimed will only proceed after written permission from the legal landowner(s) has been granted to the DEQ. This written permission will “grant consent to the Montana Department of Environmental Quality and the Office of Surface Mining Reclamation and Enforcement of the U.S. Department of the Interior, their agents, employees or contractors” to perform reclamation activities on the legally-described properties.

**Site Dimensions** – The site area extends over an area covering eight (8) Sections within Cascade County. These impacted areas have been topographically surveyed to determine

the specific volume of precipitates that shall be removed and relocated. The results of these surveys are included in Appendices B, C, and D.

***Physical Hazards*** – Because reclamation activity will occur on or adjacent to heavily-travelled routes within Cascade County, the greatest hazard for this project is the coordination of vehicle and human traffic. This potential hazard will be addressed with the contractor via the development and implementation of approved traffic control plans in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) and Best Management Practices (BMPs), which will ensure that safety measures are instituted and followed.

Other physical hazards that will require special attention are the coordination of the operation of heavy machinery in close proximity to power lines, human traffic, neighborhood pets, and livestock. These hazards will also be addressed via the implementation of BMPs with the contractor.

***Environmental Hazards*** – Environmental Hazards that will be present throughout the duration of this project are minimal, as the material that is being removed and relocated is not classified as a “Hazardous” substance requiring special permitting and transportation processes. The impacted materials to be removed directly contribute to the loss of vegetation, which leads to erosion. Additionally, this material is a direct cause of water contamination, resulting in loss of all biotic life. Therefore, this material, once removed, shall be contained from the time it is removed from the streams and ditches, until it is placed at the repository site.

***Material Characteristics*** – Sludges, sediments, and precipitates to be removed from the project areas were analyzed for total metals, pH, and lime neutralization requirements. Lime neutralization testing, as well as pH and Shoemaker, McLean, and Pratt (SMP) buffer testing, indicate that these materials are acidic but can be neutralized by addition of lime. Specific lime application rates required to neutralize the waste are shown as tons of lime ( $\text{CaCO}_3$ ) required to neutralize 1,000 tons of materials removed from the streams, ditches, and culverts.

Results of total metals testing show that the levels of metals contained in the materials are not sufficiently high to be a significant health risk to people exposed to the stream precipitates on an occasional, or recreational, basis. Comparison of metals to DEQ-AML risk-based guidelines indicates that the materials do not exceed cleanup levels established by the abandoned mine reclamation program for recreational use of mine properties.<sup>5</sup>

The Toxicity Characteristic Leaching Procedure (TCLP) was utilized to determine the potential leaching of these materials in an environment similar to a solid waste landfill. All materials tested passed the TCLP test and consequently are not classified as regulated hazardous waste. Therefore, they can be legally disposed of in a licensed solid waste landfill.

---

<sup>5</sup> Tetra Tech, Inc., "Risk-Based Cleanup Guidelines for Abandoned Mine Sites," Helena. February 1996.

Sediment test results are attached as Appendix H.

### **PREVIOUS RECLAMATION ACTIVITIES AND INVESTIGATIONS**

The AMB Program has not attempted to address the causes of AMD at the Great Falls Coal Field. The AMB Program has instead attempted to temporarily mitigate the effects of AMD on culverts, bridges, and stream channels in and around Sand Coulee, Stockett, and Tracy. The projects listed below attempted to temporarily mitigate the impacts resultant from historic mining activities in the region.

The first State of Montana led reclamation project in the Sand Coulee area was undertaken by the Department of State Lands in 1980. This project was the Heal/Sand Coulee Dump project and was undertaken at Mining Coulee, which had been utilized as a community landfill subsequent to the conclusion of coal mining activities in the area. The landfill was capped with cover soil and revegetated.

The Sand Coulee Abandoned Mine Reclamation Project occurred in 1984 and addressed dangerous piles, embankments, portals, subsidence, clogged stream lands, and hazardous facilities. The reclamation work addressed six major abandoned coal mines located north, south, east, and west of the Sand Coulee community. The mines included the Sand Coulee Mine (USGS site 14), Carbon Coke and Coal (USGS site 16), Mount Oregon/National Coal (USGS site 19), Nelson #1 on the eastern side of Sand Coulee (USGS site 20), Black Diamond Mine and Nelson #2 Mine on the western side of Sand Coulee, Dean/Dahn mine on the eastern side of Sand Coulee, and clearing 2.3 miles of clogged streams from a Sand Coulee waterway known as the “Rusty Ditch” (USGS site 4). A second Phase of this project consisted of the reclamation of dangerous piles and embankments, clogged stream lands, subsidence, and open portals. This work was performed near the confluence of Mining Coulee and Sand Coulee, corresponding to USGS water monitoring sites 14 and 16.

Another reclamation project occurred around the Sand Coulee area in 1984. This project addressed subsidence features present on land in Miners Coulee, upgradient from Coal Mine Coulee.

In 1987, an AMB project provided replacement drinking water for private residential wells contaminated by AMD. The work undertaken at that time mitigated domestic exposure to contaminated water but did not provide an additional water source to address the totality of community water system demands.

Subsidence features were identified and repaired in Miners Coulee in 1993.

The most recent activity conducted by the AMB in the Sand Coulee, Stockett, and Tracy area occurred in 1995, when repairs to a discharge structure from the Nelson #1 mine were conducted. This work consisted of grouting the structure to limit the inflow of AMD into a residential basement.

Previous investigations into the effects of historic coal mining activities in and around Sand Coulee, Stockett, and Tracy are detailed below in chronological order:

McArthur, G. M., 1970. *Acid Mine Waste Pollution Abatement Sand Coulee Creek, Montana*, MS Thesis, Montana State University, Bozeman, MT.

Hydrometrics and Western Technology and Engineering, Inc., 1982. *Master Plan: Abandoned Mine Lands Belt-Sand Coulee*. Prepared for the Department of State Lands, Abandoned Mine Lands Program, Helena, MT.

Hydrometrics, 1983. *Comprehensive Reclamation and Engineering Plan Sand Coulee Drainage – Cascade County, Montana, Phase I Reclamation Alternatives*. Prepared for the Department of State Lands, Abandoned Mine Lands Program, Helena, MT.

Osborne, T. J., Donovan, J. J., Sonderegger, J. L., 1983. *Interaction Between Groundwater and Surface Water Regimes and Mining-Induced Acid Mine Drainage in the Stockett-Sand Coulee Coal Field*, Montana Bureau of Mines and Geology Open File Report 109, Butte, MT.

Osborne, T. J., Zaluski, M. H., Harrison, B. J., Sonderegger, J. L., 1987. *Acid Mine Drainage Control in the Sand Coulee Creek and Belt Creek Watersheds, Montana 1983-1987*, Montana Bureau of Mines and Geology, Bulletin 197, Butte, MT.

Schafer and Associates, 1989. *A Summary of Acid Mine Drainage in the Sand Coulee Creek and Belt Creek Drainage Basins*. Prepared for the Department of State Lands, Abandoned Mine Lands Program, Helena, MT.

Karper, P. L., 1998. *Water Quality Data (July 1994 through September 1996) and Statistical Summaries of Data for Surface Water in the Sand Coulee Coal Area, Montana*, United States Geological Survey Open File Report 98-94.

Rossillon, M., McCormick, M., Hufstetler, M., 2009. *Great Falls Coal Field: Historical Overview*. Prepared for the Department of Environmental Quality, Abandoned Mine Lands Program by Renewable Technologies, Inc., Butte, MT.

Gammons, C. H., Duaime, T. E., Parker, S. R., Poulson, S. R., Kennelly, P., 2010. Geochemistry and stable isotope investigation of acid mine drainage associated with abandoned coal mines in central Montana, USA, *Chemical Geology* 269, 100-112.

Renewable Technologies, Inc., 2010. Cultural Resource Inventory. Prepared for the Department of Environmental Quality, Abandoned Mine Lands Program, Helena, MT.

Specific actions, which are proposed as part of this reclamation project, include:

- a. Establish access

- b. Removal of metals and precipitates from ditches, within culverts, and beneath bridges
- c. Relocation of metals and precipitates

The Office of Surface Mining and Enforcement Field Office Director must authorize the use of Montana Mine Waste Cleanup Bureau, Abandoned Mines Bureau funding to accomplish the reclamation project described above.

## **CHAPTER 2 – DESCRIPTION OF THE ALTERNATIVES**

### **A. OTHER ALTERNATIVES CONSIDERED BUT REJECTED FROM FURTHER ANALYSIS**

1. **No Action Alternative**

No action. No steps would be taken to mitigate the accumulation of impacted precipitates and metals from within culverts and beneath bridges.

2. **Dredging of the Entire Distances of Straight, Sand Coulee, and Cottonwood Creeks, as well as their Unnamed Tributary Streams and Ditches**

Dredging of the entire lengths of these waterways could serve to ameliorate these stretches of waterway to a greater extent than will the “Recommended Alternative”; however, study suggests that this effort would be exceedingly costly and would, like the Recommended Alternative, need to recur every few decades. Additionally, dredging of the entire length of these Creeks and ditches would not improve water quality. Because precipitates will continue to flow into these waterways, it would not be financially sound to dredge the entire lengths of these waterways and repeat this action frequently.

3. **Permanent Closure of All Known, Existing Coal Mines within the Region**

The permanent closure of all known and existing mines within the region is an option that is costly and whose alleged results have never been exhibited. To date, there is no known example whereby an abandoned mine has been permanently sealed. The option of finding a permanent method by which to seal all area mines, thereby preventing any seepage of precipitates and metals into these waterways and ditches, is, at present, unproven.

### **B. RECOMMENDED ALTERNATIVE**

Under this Alternative, the Office of Surface Mining Reclamation and Enforcement (OSMRE) Field Office Director would approve removal of materials adversely impacted by precipitates from beneath bridges and from within culverts along identified stretches of Sand Coulee, Straight, and Cottonwood Creeks, as well as identified streams and ditches in and around Sand Coulee, Stockett, and Tracy.

The immediate problem is that precipitates have accumulated to such an extent within the culverts and beneath the bridges along the identified stretches that flooding of private lands and public roadways has resulted. The proposed action for the Great Falls Coal

Field Clogged Streams project is the removal of impacted materials from beneath bridges and within culverts along identified stretches of Sand Coulee Creek, Straight Creek, and Cottonwood Creek, in addition to identified stretches of ditches adjacent to East Hunter Road, State Route 227, and Cottonwood Coulee Road. This recommended alternative is dependent upon input from citizens and landowners. This approach would temporarily address flooding as one of the negative impacts resultant from historic effects of coal mining within the communities of Sand Coulee, Stockett, and Tracy, in addition to ameliorating the environmental impacts of flooding upon humans, wildlife, and livestock in and around the identified areas. Additional considerations and/or steps related to this alternative include:

1. Access to the sites. This project will not be conducted without consent for entry being provided by affected landowners, both private and public. Because these waterways transport impacted material from one property, downstream, to another, the inability to reclaim a specific section will ultimately result in the material being transported downstream to another property.
2. Institution of Best Management Practices (BMPs). BMPs will be instituted to mitigate conflicts and/or dangerous situations from arising between the contractors' workers and equipment and those traveling and living within the project's corridor. Additionally, erosion control measures, such as performing removal work from a solid platform placed over vegetation, will prevent vegetation from being denuded as a result of heavy equipment movement.
3. The distance that material will need to move once it has been removed from the ditch or waterway will be limited to avoid windblown materials.
4. Equipment access routes will be constructed along East Hunter Road, State Route 227, and Cottonwood Coulee Road to mitigate potential damage to vegetation adjacent to these routes and the waterways where reclamation activity will occur.
5. Reclamation of the disturbed area will require that the areas where material is removed be left with a pre-defined slope to comply with state waterway regulations. This is specifically illustrated in cross-sections of the ditch design (Appendix C).

The proposed time schedule for the Recommended Alternative is:

Spring 2012	Acquire Consents for Entry for the Montana Department of Environmental Quality and the Office of Surface Mining Reclamation and Enforcement of the U.S. Department of the Interior, their agents, employees or contractors from all potentially impacted landowners
	Release Environmental Assessment for review and comment
	Finalize required permitting with State and Federal agencies

	Finalize engineering design of precipitate removal
	Conduct two (2) separate meetings in the Sand Coulee, Stockett, or Tracy area to address questions and comments from local citizens
Summer 2012	Conduct removal actions from the stretches identified in Appendix A
	Project monitoring
Fall 2012	Completion of project records and reporting

## CHAPTER 3 – THE AFFECTED ENVIRONMENT

### A. GENERAL SETTING

Sand Coulee is located in a narrow valley floor area with an elevation of approximately 3,465 feet with a slight grade of 1-2% descending in the northeast direction. Flat top bluffs border the community to the east and west at elevations of approximately 3,700 feet, roughly 235 feet above the valley bottom. The surrounding area is generally agricultural and rangeland with trees present primarily in the coulees and adjacent to irrigation ditches. Sand Coulee, Stockett, and Tracy were established as coal mining towns and numerous abandoned mines are present in the area.

The creek that flows through Sand Coulee is Straight Creek, a channelized tributary of Sand Coulee Creek, which originates approximately 3.5 miles southwest of the town of Sand Coulee and flows northeast to its confluence with Sand Coulee Creek just north of Tracy. This creek is heavily contaminated with mine waste and AMD and is orange in color. An inventory of abandoned mine features in the Sand Coulee area conducted in the early 1980s identified 30 mine waste dumps, approximately 40 subsidence depressions, 10 acid mine discharges, 10 open adits, 22 collapsed adits, and two open air shafts.<sup>6</sup> There are presently 29 abandoned mine inventory sites within one mile of Sand Coulee, with seven sites directly adjacent to the community of Sand Coulee. There are five abandoned coal mines that have continuous or nearly continuous discharges into Sand Coulee.<sup>7</sup>

The geology of the area consists of a gently dipping sequence of sedimentary rocks that slope to the north and west exposing progressively older formations in the upstream drainages to the south. The Kootenai Formation underlies the upland terraces and forms the coulee walls surrounding Sand Coulee. It is comprised of interbedded shale and

---

<sup>6</sup> Hydrometrics. *Comprehensive Reclamation and Engineering Plan Sand Coulee Drainage – Cascade County, Montana, Phase I Reclamation Alternatives*. Helena: Prepared for the Department of State Lands, Abandoned Mine Lands Program, 1983.

<sup>7</sup> Ibid.



siltstone lenses with discontinuous sandstone beds.<sup>8</sup> Typical thickness of the Kootenai Formation in the Sand Coulee area is approximately 180 feet.<sup>9</sup> The basal member of the Kootenai Formation is coarse-grained, cross-bedded sandstone with beds of conglomeratic pebble sandstone deposited in the channels of a major river system.<sup>10</sup> The basal Kootenai is typically 30 to 45 feet thick and is laterally continuous.<sup>11</sup> The basal Kootenai overlies the coal deposit of the Upper Morrison Formation on an erosional unconformity and forms the roof of most of the coal mines in the area.<sup>12</sup>

The Morrison Formation consists of 120 to 180 feet of mudstone containing lenses of limestone, sandstone, coal, and shale that were deposited in lacustrine and flood plain environments.<sup>13</sup> Mining occurred in the Stockett Bed in the upper part of the Morrison Formation, which includes medium-grade bituminous coal deposits and dark gray carbonaceous shale at the upper contact with the Kootenai Formation. The coal seam contains a high percentage of sulfur which occurs in the form of iron-pyrite nodules disseminated throughout the coal.

The Morrison Formation is underlain by the Swift Formation, calcareous, coarse- to fine-grained sandstone with interbedded shale ranging from 0 to 40 feet thick in the Sand Coulee area.<sup>14</sup> The Swift Formation is underlain by the Madison Group Mission Canyon and Lodgepole Formations, which are generally referred to together as the Madison Limestone. The thickness of the Madison Limestone in the Great Falls area ranges from 1,200 to 1,700 feet and consists of thick-bedded increasing to massive limestone with thin, chert interbeds transitioning downward into thinner-bedded limestone and mudstone.<sup>15</sup> Its top is exposed locally along the bottom of Cottonwood Coulee, approximately one (1) mile east of Sand Coulee.

Unconsolidated Quaternary deposits overlie bedrock in valley bottoms. The unconsolidated deposits are comprised of fluvial sand, silt and clay, windblown sand, older alluvial terrace deposits, colluvium, landslide deposits, and lacustrine silt and clay. Generally, the thickness of the Quaternary deposits is 30 feet or less in the small coulees. North of Tracy, alluvial deposits inter-finger with the outwash and lacustrine deposits of

---

<sup>8</sup> Wilkie, K.R. *Appraisal of Water in Bedrock Aquifers, Northern Cascade County, Montana*. Helena: USGS Open File Report 82-1025, 1983.

<sup>9</sup> Hydrometrics. *Water Supply Assessment*. Helena: Prepared for the Department of Environmental Quality, Abandoned Mine Lands Program, 2010.

<sup>10</sup> Osborn, T.J., J.J. Donovan, and J.L. Sonderegger. *Interaction Between Groundwater and Surface Water Regimes and Mining-Induced Acid Mine Drainage in the Stockett-Sand Coulee Coal Field*. Butte: Montana Bureau of Mines and Geology Open File Report 109, 1983.

<sup>11</sup> Silverman and Harris. *Stratigraphy and Economic Geology of the Great Falls-Lewistown Coal Field*. 1967.

<sup>12</sup> Osborn, T.J., J.J. Donovan, and J.L. Sonderegger. *Interaction Between Groundwater and Surface Water Regimes and Mining-Induced Acid Mine Drainage in the Stockett-Sand Coulee Coal Field*. Butte: Montana Bureau of Mines and Geology Open File Report 109, 1983.

<sup>13</sup> Silverman and Harris. *Stratigraphy and Economic Geology of the Great Falls-Lewistown Coal Field*. 1967.

<sup>14</sup> Hydrometrics and Western Technology and Engineering, Inc. *Master Plan: Abandoned Mine Lands Belt-Sand Coulee*. Helena: Prepared for the Department of State Lands, Abandoned Mine Lands Program, 1982.

<sup>15</sup> Smith, L. *Altitude of the top of the Madison Group in part of Cascade County, Montana*. Montana Ground-water Assessment Atlas 7, Part B, Map 3, 2008.

the ancient Missouri River channel. The glacio-lacustrine sediments in the ancestral Missouri channel currently occupied by lower Sand Coulee Creek exceed 300 feet in thickness.<sup>16</sup>

## **B. CRITICAL ELEMENTS**

### *Cultural or Historic Resource Values*

Extensive cultural resource evaluation and documentation was conducted in the 1980s when AML reclamation projects were first constructed in the coalfield. These evaluations were, however, conducted piecemeal, and in 2009 a Historic Overview was produced for the Great Falls Coalfield. DEQ has consulted with the Montana State Historical Preservation Office (SHPO) on the potential for cultural resources to be impacted by this project, and SHPO indicated that any structure over fifty years of age is considered historic and is potentially eligible for listing on the National Register of Historic Places. SHPO concluded that if there is no disturbance to structures over 50 years of age, there is a low likelihood that cultural properties would be impacted by the project. Owing to the fact that this project's activities will occur within ditches and creeks, no structures will be disturbed, thereby eliminating the need for further cultural inventories to be conducted. DEQ has thus determined that no historic properties exist in the route of the Clogged Streams Project and that the project will have no effect on properties eligible for listing on the National Register. SHPO concurred with this determination on (Correspondence with SHPO is reproduced in Appendix E.)

### *Hydrology*

#### Surface Water

Surface waters in the area include Straight Creek, which flows through the Sand Coulee community and is locally referred to as "Rusty Ditch." This section of creek was realigned and channelized with the initial entrance of the railroad into Sand Coulee in 1888. "Rusty Ditch" flows along the western edge of the former rail bed. Streamflow is ephemeral and typically ranges from zero to three cubic feet per second (cfs) in the vicinity of the town. Straight Creek flows north through the town of Sand Coulee until its junction with Sand Coulee Creek, just north of the town of Tracy. There are no lakes within the immediate area. Sand Coulee is located in an area determined to be outside the 500 year flood plain. Flooding attributable to clogged culverts in "Rusty Ditch" has been reported.<sup>17</sup>

Cottonwood Creek flows west along Cottonwood Coulee Road until it reaches the town of Stockett, where it turns north and joins Sand Coulee Creek at the town of Centerville.

---

<sup>16</sup> Osborn, T.J., M.H. Zaluski, B.J. Harrison, and J.L. Sonderegger. "Acid Mine Drainage Control in the Sand Coulee Creek and Belt Creek Watersheds, Montana 1983-1987." *Montana Bureau of Mines and Geology*. Bulletin 197, Butte, 1987.

<sup>17</sup> Hydrometrics. *Comprehensive Reclamation and Engineering Plan Sand Coulee Drainage – Cascade County, Montana, Phase I Reclamation Alternatives*. Helena: Prepared for the Department of State Lands, Abandoned Mine Lands Program, 1983.

From this location, it is known as Sand Coulee Creek and proceeds through the town of Tracy, being joined by Straight Creek north of Tracy. Sand Coulee Creek then flows northerly and discharges to the Missouri River upstream of Great Falls. Sand Coulee Creek is not classified as a major stream and is a 5<sup>th</sup> code watershed.

#### Acid Mine Drainage

AMD is a characteristic of the coal mines in the Great Falls Coal Field reflecting the presence of pyrite, oxygen, and water in the abandoned coal mines. At Sand Coulee, the mine design facilitated drainage and haulage while the mines were operating. This characteristic now acts to facilitate discharges from the drainage tunnels developed during mining. The water exiting the abandoned mines surrounding the Sand Coulee community contains approximately 500 milligrams per Liter (mg/L) dissolved iron and has a pH of approximately 3. None of the mine discharges in the Sand Coulee area meet federal or Montana primary and secondary drinking water standards. Due to high acidity and high concentrations of total dissolved solids and metals, mine effluents are also unsuitable for irrigation and livestock use.<sup>18</sup>

The U.S. Geological Survey collected monthly water quality and streamflow data at 27 sites in the Sand Coulee and Belt Creek basins from July 1994 through September 1996.<sup>19</sup> This study included establishing four monitoring stations for mining discharges near the town of Sand Coulee (USGS stations 14, 16, 19, and 20) and “Rusty Ditch” in the community (USGS station 4).<sup>20</sup> This study indicated that the median pH of “Rusty Ditch” was 2.7, and median concentrations of dissolved cadmium, chromium, iron, manganese, nickel, sulfate, zinc, and total dissolved solids were 0.021, 0.11, 360, 4.0, 2.8, 4500, 11, and 5810 mg/L, respectively.<sup>21</sup> These levels exceed federal and Montana primary and secondary drinking water standards.

Stream channels cut into the alluvium carry most of the AMD discharge. In the vicinity of Sand Coulee, the alluvial deposits deepen and stream flow is partially or entirely lost to the alluvium. AMD is therefore a continuous source of contamination to the unconsolidated alluvial aquifer.<sup>22</sup> Residents abandoned alluvial wells and consequently there are very few existing domestic wells completed in this aquifer.<sup>23</sup> A groundwater investigation conducted from 1985 through 1987 determined that the alluvial aquifer is

---

<sup>18</sup> Hydrometrics and Western Technology and Engineering, Inc. *Master Plan: Abandoned Mine Lands Belt-Sand Coulee*. Helena: Prepared for the Department of State Lands, Abandoned Mine Lands Program, 1982.

<sup>19</sup> Karper, P.L. *Water Quality Data (July 1994 through September 1996) and Statistical Summaries of Data for Surface Water in the Sand Coulee Coal Area, Montana*. United States Geological Survey Open File Report 98-94, 1998.

<sup>20</sup> Ibid.

<sup>21</sup> Ibid.

<sup>22</sup> Osborn, T.J., J.J. Donovan, and J.L. Sonderegger. *Interaction Between Groundwater and Surface Water Regimes and Mining-Induced Acid Mine Drainage in the Stockett-Sand Coulee Coal Field*. Butte: Montana Bureau of Mines and Geology Open File Report 109, 1983.

<sup>23</sup> Osborn, T.J., M.H. Zaluski, B.J. Harrison, and J.L. Sonderegger. "Acid Mine Drainage Control in the Sand Coulee Creek and Belt Creek Watersheds, Montana 1983-1987." *Montana Bureau of Mines and Geology*. Bulletin 197, Butte, 1987.

contaminated by Sand Coulee Creek at least over a distance of 1,200 feet from the creek.<sup>24</sup>

Shallow alluvial wells have been replaced by deeper bedrock wells constructed in the underlying Swift sandstone and Madison limestone in an attempt to avoid AMD contamination; however, both aquifers show evidence of AMD contamination. Osborne et al. (1983) reported that the fractured nature of the underlying bedrock, the presence of solution cavities in the Madison limestone, and the steep vertical hydraulic gradients have distributed contaminated groundwater to the deeper bedrock aquifers in the area.<sup>25</sup> Elevated concentrations of Total Dissolved Solids (TDS) and sulfate indicate that seven of 16 wells completed in the Swift sandstone and Madison limestone within the Sand Coulee area are contaminated, to some extent, by downward leaking AMD.

### Groundwater

In 1909, Fisher identified the basal Kootenai sandstone as an important aquifer in the area yielding water to domestic wells and springs.<sup>26</sup> In 1968, Goers reported that the basal Kootenai sandstone was the most utilized aquifer in the area.<sup>27</sup> He also, however, recognized that this aquifer may be dewatered by the abandoned mines in the Morrison coal underlying the Kootenai sandstone.<sup>28</sup> Osborne et al. (1983) and Osborne et al. (1987) determined that the abandoned coal mines south of Sand Coulee have resulted in significant changes to the regional groundwater flow system. Three of these discharging adits, the Upper Carbon Mine, Lower Carbon Mine, and the Mt. Oregon Drain, are immediately south of Sand Coulee and intercept groundwater flowing toward Sand Coulee from the regional recharge areas located to the southeast in the Little Belt Mountains. The dewatering of the basal Kootenai aquifer has led to a large area of thinly saturated or unsaturated aquifer in the vicinity of Sand Coulee and Stockett.<sup>29</sup>

Few wells are completed in the Swift formation within the project area, and the majority of these wells are in the Stockett area. Goers concluded that recharge to the Swift Formation is limited by the low permeability shale beds in the overlying Morrison Formation and by updip truncation of the Swift Formation along the Little Belt Mountains.<sup>30</sup>

---

<sup>24</sup> Ibid.

<sup>25</sup> Osborn, T.J., J.J. Donovan, and J.L. Sonderegger. *Interaction Between Groundwater and Surface Water Regimes and Mining-Induced Acid Mine Drainage in the Stockett-Sand Coulee Coal Field*. Butte: Montana Bureau of Mines and Geology Open File Report 109, 1983.

<sup>26</sup> Fisher, C.A. "Geology of the Great Falls Coal Field Montana." *United States Geological Survey Bulletin 356*, Washington, D.C., 1909.

<sup>27</sup> Goers, J.W. "Geology and groundwater resources, Stockett-Smith River area, Montana." The University of Montana, M.S. Thesis. Missoula, MT, 1968.

<sup>28</sup> Osborn, T.J., M.H. Zaluski, B.J. Harrison, and J.L. Sonderegger. "Acid Mine Drainage Control in the Sand Coulee Creek and Belt Creek Watersheds, Montana 1983-1987." *Montana Bureau of Mines and Geology. Bulletin 197*, Butte, 1987.

<sup>29</sup> Ibid.

<sup>30</sup> Goers, J.W. "Geology and groundwater resources, Stockett-Smith River area, Montana." The University of Montana, M.S. Thesis. Missoula, MT, 1968.

Water provided by the Madison supplies community domestic, stock, industrial, and minor irrigation purposes in the Sand Coulee, Stockett, and Tracy area.<sup>31</sup> North-flowing groundwater in the Madison is typical, and this water tends to discharge into shallower formations or surface water.<sup>32</sup> Wells completed in the Madison yield an average of 30 gallons per minute (gpm); however, yields of 500 gpm have been reported.<sup>33</sup>

The Kootenai Formation is recharged by infiltration of precipitation, with groundwater flowing generally to the northwest from regional recharge areas located to the southeast in the Little Belt Mountains. Although historic coal mining does not appear to have impacted the groundwater quality within this aquifer, the mine workings have provided a drainage network which dewateres the Kootenai Formation. This dewatering is facilitated by vertical fracturing of the Kootenai Formation, associated with the presence of a major anticlinal structure, the South Arch, in the area. Recent fracturing of the Kootenai Formation may have also developed during the coal removal activities and from ground subsidence following mining. The Gerber mine discharges AMD to “Kate’s Coulee,” which discharges into “Rusty Ditch,” which flows through the community. The Gerber mine is located south of the Sand Coulee well field and is likely contributing to the dewatering of the Kootenai aquifer.

The Stockett water supply emanates from the Swift Formation and wells average yields of five to 100 gpm. The majority of deleterious impacts effecting Stockett groundwater arrive directly from seepage exiting the Cottonwood No. 6 mine.

Groundwater at Tracy arrives from Sand Coulee via Straight Creek, roughly one mile downstream, and from Centerville via Sand Coulee Creek, roughly two miles downstream. None of these streams are perennial, and late fall/winter presents dry channels throughout Tracy.

### ***Land Use***

The Sand Coulee area is primarily surrounded by agriculture and rangeland with urban designation for the communities of Sand Coulee, Tracy, and Stockett. No significant changes in land uses are anticipated in the planning area.

### ***Vegetation***

Soils in the area of Sand Coulee are Bitton and Roy Soils with 10-65% slopes and Fergus silty clay loams (located primarily in and around the Sand Coulee Community) with 2-15% slopes. Both soil types are considered well drained with no frequency of flooding. The Bitton and Roy soils have a profile from 1-60 inches in depth of stony loam to very stony loam. The Fergus silty clay loam material has a profile from 1-60 inches of silty clay loams. Land use in Sand Coulee, Stockett, and Tracy is urban and the dominant

---

<sup>31</sup> Smith, L. *Altitude of the top of the Madison Group in part of Cascade County, Montana*. Montana Ground-water Assessment Atlas 7, Part B, Map 3, 2008.

<sup>32</sup> Ibid.

<sup>33</sup> Ibid.

vegetation is cultivation typical of small town Montana. Most work surfaces during this project will be maintained streets with either pavement or gravel surface, and, where it is necessary for activity to occur over vegetation, a construction pad will be used to minimize vegetation disturbance.

### ***Fish and Wildlife***

The potential impacts to plant and animal species of concern was determined utilizing the Montana National Heritage Program and via evaluation of the project area by DEQ personnel. Search results indicated that no U.S. Fish and Wildlife Service listed threatened or endangered plant or animal species were identified in the project area. Montana Fish, Wildlife, and Parks concurrence with this assessment is presented as Appendix F.

### ***Recreational Resource Values***

This project is located on State and County rights-of-way, as well as private land. All requisite permits and consents for entry will be acquired to conduct work at the site. No Wilderness Areas, National Parks, Wild and Scenic Rivers or other recreational resource areas are contained within the project area. Open lands on the edge of Sand Coulee, Stockett, and Tracy are private property utilized for ranching and farming.

### ***Air Quality***

Air quality in Cascade County is classified as “Unclassifiable/Attainment or Better than National Standards” (40 CFR 81.327) for the National Ambient Air Quality Standards for all criteria pollutants.

### ***Noise***

This site is situated within three, small residential communities and the rural lands between them. Noise in the community is limited to noises associated with residential use, traffic noise associated with the county and state roads through these communities, and any noise that might intrude from nearby farming or ranching operations.

### ***Social and Economic Values***

The communities of Sand Coulee, Stockett, and Tracy are unincorporated towns. Accurate information specific to population and income values for those that reside within these areas cannot be directly determined through 2010 Census information as Census data is specific to a larger geographical area that is not coincident with the project boundary.

The statistics for the 2010 Cascade County census specific to population and number of households documents that there are 81,327 people and 37,276 households within Cascade County, which equates to 2.18 people per household. 2000 Census information

for Cascade County indicates that there was a population of 80,357. These figures represent a 1.2% population increase within this past decade.

***Conformance with Federal, State, Regional, and/or Local Land Use Plans, Programs, and Policies***

Reclamation construction activities associated with the Recommended Alternative would comply with Montana's Abandoned Mine Reclamation State Plan. Removal of precipitates and accumulated AMD will help alleviate future flooding resulting from clogged bridges and culverts in and around the towns of Sand Coulee, Stockett, and Tracy.

***Environmental Justice***

Based on United States Government 2010 Census figures, the median household income in Cascade County is \$42,389. The dominant race in Cascade County is "White" with 89.2% of the population. The next largest percentage of the population by race is "American Indian," with 4.3%.

The Abandoned Mines Bureau has prioritized the Great Falls Coal Field Clogged Streams Project in accordance with the programmatic mandate requiring reclamation of eligible coal sites as the highest reclamation priority. No consideration regarding the selection of this project was made in relation to income or race.

## **CHAPTER 4 – ALTERNATIVES' ENVIRONMENTAL CONSEQUENCES**

### **A. ALTERNATIVES NOT SELECTED**

#### **NO ACTION ALTERNATIVE**

This option will result in continued degradation of these waterways and ditches, thereby causing increased occurrences of flooding and damage to private and public properties.

#### **DREDGING OF THE ENTIRE DISTANCES OF STRAIGHT, SAND COULEE, AND COTTONWOOD CREEKS, AS WELL AS THEIR UNNAMED TRIBUTARY STREAMS AND DITCHES**

1. Increased potential for re-growth of vegetation in formerly impacted areas
2. Possible increased soil stability from vegetation growth
3. Decreased spread of impacted materials throughout the lengths of these ditches and waterways



4. Immediate, yet temporary, prevention of flooding related to clogged bridges and culverts
5. Temporary alleviation of accumulated precipitates beneath bridges, within culverts, and along the entire lengths of these waterways
6. Reduction of physical hazards associated with flooding and the spread of impacted mine metals and precipitates throughout the three communities of Sand Coulee, Stockett, and Tracy, as well as rural areas located downstream
7. Improved fluvial dynamics throughout the lengths of these waterways
8. Improved roadway durability and decreased required road maintenance

**PERMANENT CLOSURE OF ALL KNOWN, EXISTING COAL MINES WITHIN THE REGION**

1. Prevention of any future precipitates and AMD exiting the mines into these waterways
2. Increased potential for re-growth of vegetation in formerly impacted areas
3. Increased soil stability from vegetation growth
4. A potential for increased biotic presence
5. Decreased spread of impacted materials throughout the lengths of these ditches and waterways
6. Immediate prevention of flooding related to clogged bridges and culverts
7. Alleviation of accumulated precipitates beneath bridges and within culverts
8. Possible re-growth of vegetation in areas previously subjected to impacted materials resultant from flooding
9. Reduction of physical hazards associated with flooding and the spread of impacted mine metals and precipitates throughout the three communities of Sand Coulee, Stockett, and Tracy, as well as rural areas located downstream
10. Improved fluvial dynamics in and around bridges and culverts
11. Improved roadway durability and decreased required road maintenance

## **B. RECOMMENDED ALTERNATIVE**

Approval and implementation of the Recommended Alternative will result in the following site reclamation consequences:

1. Immediate, yet temporary, prevention of flooding related to clogged bridges and culverts
2. Temporary alleviation of accumulated precipitates beneath bridges and within culverts
3. Possible re-growth of vegetation in areas impacted by materials resultant from flooding
4. Reduction of physical hazards associated with flooding and the spread of impacted mine metals and precipitates throughout the three communities of Sand Coulee, Stockett, and Tracy, as well as rural areas located downstream
5. Improved fluvial dynamics in and around bridges and culverts
6. Improved roadway durability and decreased required road maintenance

## **CHAPTER 5 – CONSULTATION AND COORDINATION**

### **A. PERSONS, ORGANIZATIONS, AND AGENICES CONTACTED**

Josef Warhank  
State Historical Preservation Office  
1310 8<sup>th</sup> Avenue  
P.O. Box 201202  
Helena, MT 59620

George Liknes  
Montana FWP  
4600 Giant Springs Rd.  
Great Falls, MT 59405

Jeff Ryan  
DEQ Water Protection Bureau  
P.O. Box 200901  
Helena, MT 59620-0901

Todd Tillinger  
US Army Corps of Engineers  
10 West 15<sup>th</sup> Street, Suite 2200  
Helena, MT 59626

Tony Strainer  
Montana Department of Transportation  
Great Falls Division Maintenance Chief  
P.O. Box 1359  
Great Falls, MT 59403-1359

Brian Clifton  
Public Works Director  
Cascade County  
121 4<sup>th</sup> Street North #2H-2I  
Great Falls, MT 59401

## **B. PREPARERS AND REVIEWERS**

Hayden Janssen  
Montana Department of Environmental Quality  
Mine Waste Cleanup Bureau  
Abandoned Mines Bureau  
1100 N. Last Chance Gulch  
P.O. Box 200901  
Helena, MT 59620-0901

John Koerth  
Bureau Chief  
Montana Department of Environmental Quality  
Mine Waste Cleanup Bureau  
Abandoned Mines Bureau  
1100 N. Last Chance Gulch  
P.O. Box 200901  
Helena, MT 59620-0901

## **CHAPTER 6 – REFERENCES**

Fisher, C.A. "Geology of the Great Falls Coal Field Montana." *United States Geological Survey Bulletin 356*, Washington, D.C., 1909.

Goers, J.W. "Geology and Groundwater Resources, Stockett-Smith River Area, Montana."

Hydrometrics and Western Technology and Engineering, Inc. *Master Plan: Abandoned Mine Lands Belt-Sand Coulee*. Helena: Prepared for the Department of State Lands, Abandoned Mine Lands Program, 1982.

Hydrometrics. *Comprehensive Reclamation and Engineering Plan Sand Coulee Drainage – Cascade County, Montana, Phase I Reclamation Alternatives*. Helena: Prepared for the Department of State Lands, Abandoned Mine Lands Program, 1983.

Hydrometrics. *Water Supply Assessment*. Helena: Prepared for the Department of Environmental Quality, Abandoned Mine Lands Program, 2010.

Karper, P.L. *Water Quality Data (July 1994 through September 1996) and Statistical Summaries of Data for Surface Water in the Sand Coulee Coal Area, Montana*. United States Geological Survey Open File Report 98-94, 1998.

Osborn, T.J., J.J. Donovan, and J.L. Sonderegger. *Interaction Between Groundwater and Surface Water Regimes and Mining-Induced Acid Mine Drainage in the Stockett-Sand Coulee Coal Field*. Butte: Montana Bureau of Mines and Geology Open File Report 109, 1983.

Osborn, T.J., M.H. Zaluski, B.J. Harrison, and J.L. Sonderegger. "Acid Mine Drainage Control in the Sand Coulee Creek and Belt Creek Watersheds, Montana 1983-1987." *Montana Bureau of Mines and Geology*. Bulletin 197, Butte, 1987.

Rossillon, Mitzi, Mary McCormick, and Mark Hufstetler, "Great Falls Coal Field: Historic Overview." Prepared for the Department of Environmental Quality, Abandoned Mine Lands Program by Renewable Technologies Inc. Butte, Montana: 2009.

Silverman and Harris. *Stratigraphy and Economic Geology of the Great Falls-Lewistown Coal Field*. 1967.

Smith, L. *Altitude of the top of the Madison Group in part of Cascade County, Montana*. Montana Ground-water Assessment Atlas 7, Part B, Map 3, 2008.

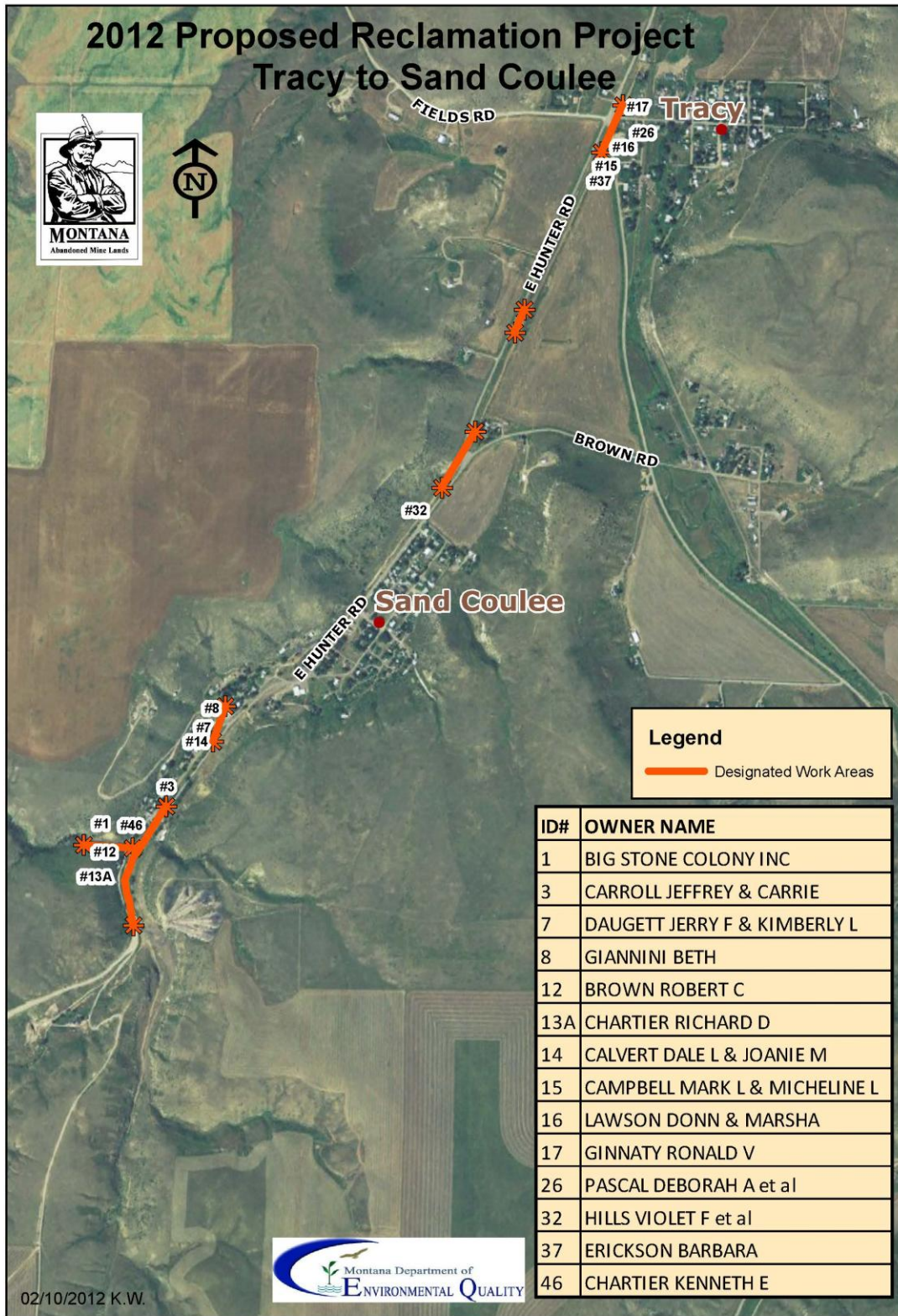
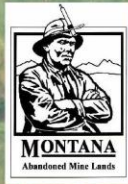
Tetra Tech, Inc., "Risk-Based Cleanup Guidelines for Abandoned Mine Sites," Helena. February 1996.

Wilkie, K.R. *Appraisal of Water in Bedrock Aquifers, Northern Cascade County, Montana*. Helena: USGS Open File Report 82-1025, 1983.

# **Appendix A**

Maps of Proposed Work Areas, Identifying Affected Landowners

# 2012 Proposed Reclamation Project Tracy to Sand Coulee





# 2012 Proposed Reclamation Project Centerville to Stockett

Centerville



## Legend

 Designated Work Areas

ID#	OWNER NAME
4A	KLASNER ROBERT JR
4B	KLASNER ROBERT JR
4C	KLASNER ROBERT JR
4D	KLASNER ROBERT JR
6	BURKETT DAVID P & NAOMI L
13B	CHARTIER RICHARD D
13C	CHARTIER RICHARD D
19A	FLOYD CHURCH
19B	FLOYD CHURCH
20	GREEN JASON W & KRIS M
23	STOCKETT WATER & SEWER DISTRICT
27A	MARKO DAVID L & SHERRY S
27B	MARKO DAVID L & SHERRY S
27C	MARKO DAVID L & SHERRY S
29	HALKO STEVEN F & MARLENA R
33	THREE RIVERS RURAL TELEPHONE COOP
35	LENCIONI BRADLEY J & MICHELLE
38	GUISTI RONALD N & JUDITH F
39	GUISTI BRIAN
42	BRANDVOLD MARY L

Stockett



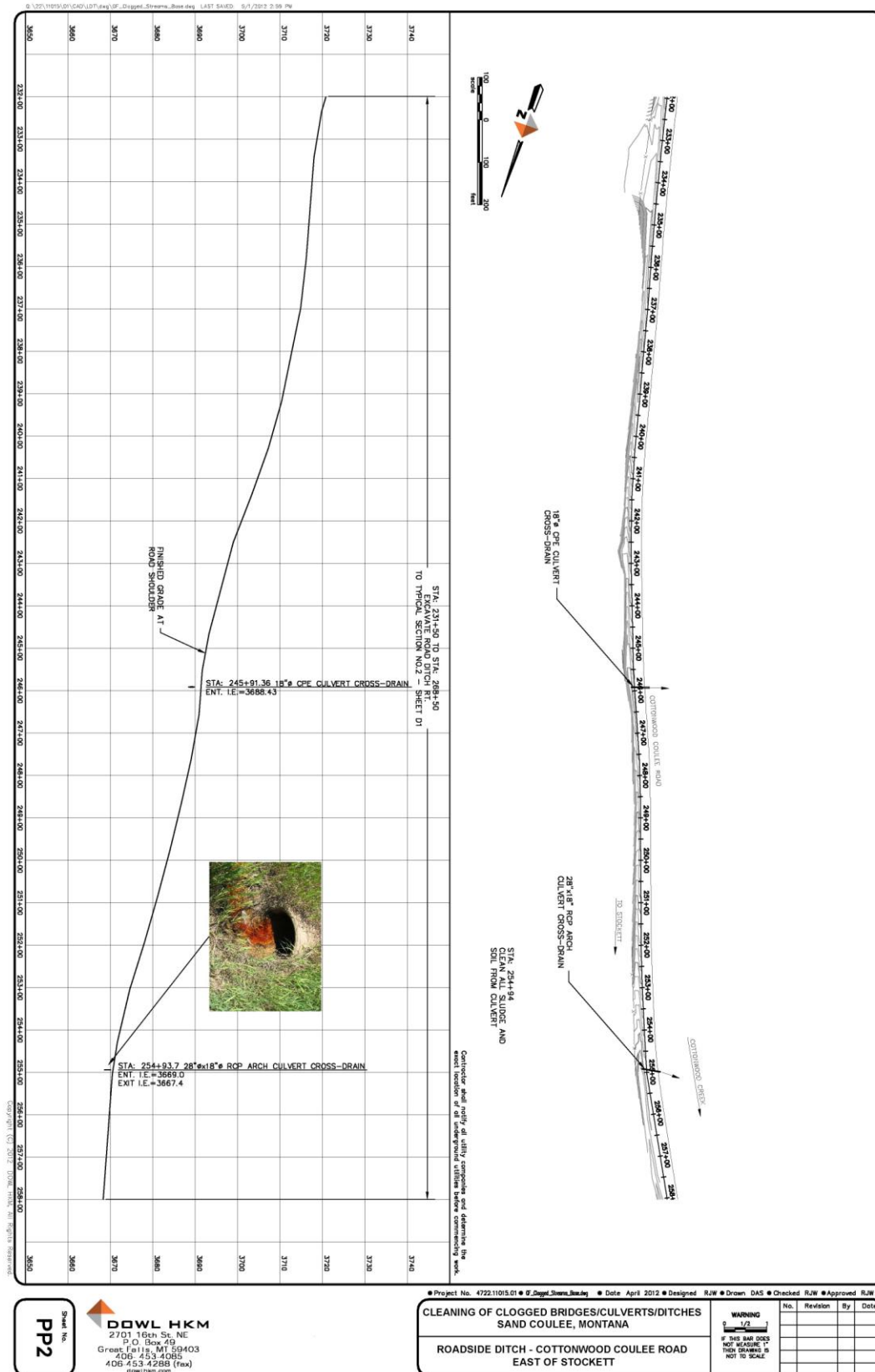
02/10/2012 K.W.



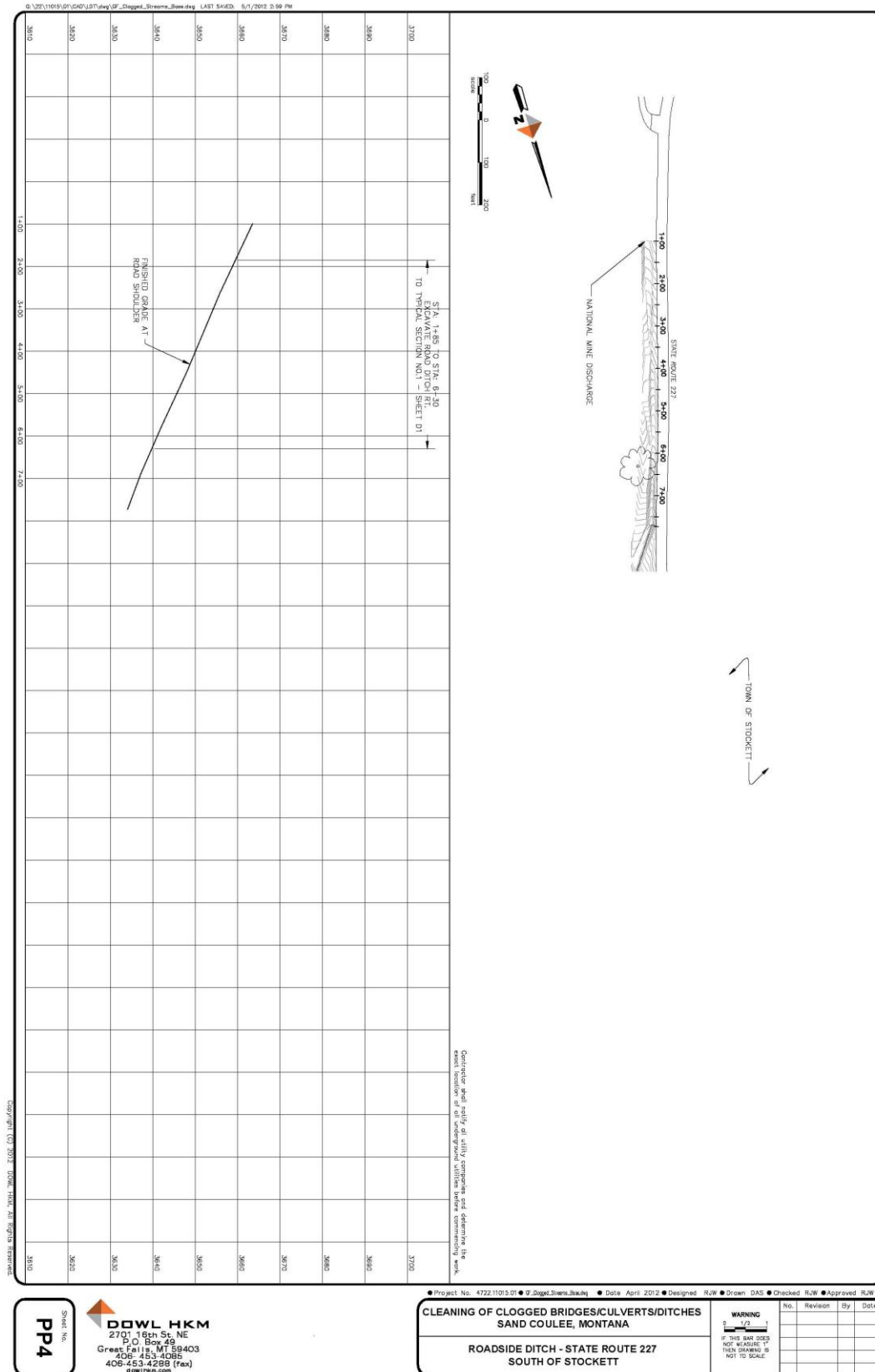
# **Appendix B**

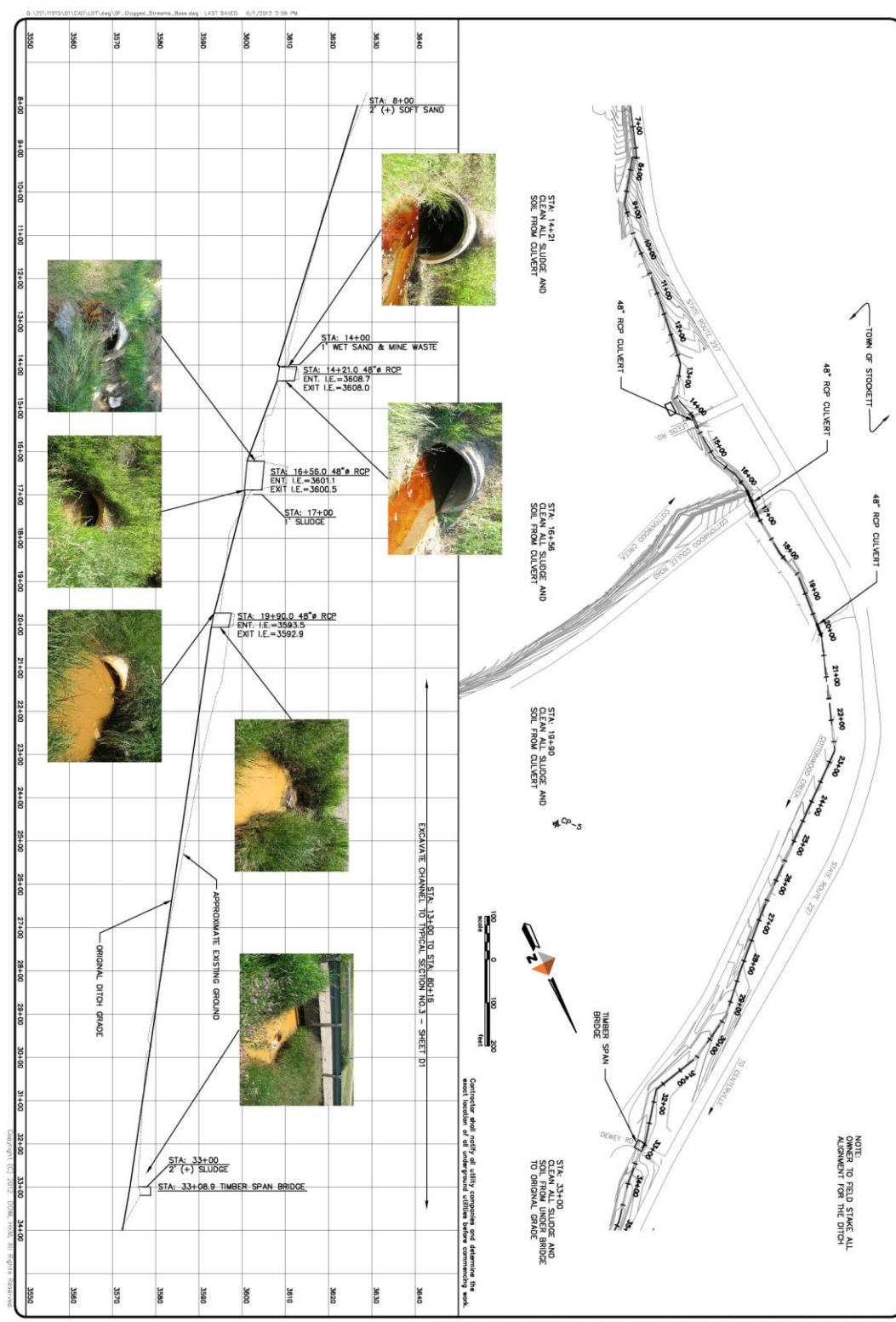
Plan and Profile Sheets















**DOWL HKM**  
2701 18th St. NE  
P.O. Box 49  
Great Falls, MT 59403  
406 453 4085  
406 453 4288 (fax)  
dowl-hkm.com



PP5

Project No. 4722-11015.01 • 2-2012-2013 • Date: April 2012 • Designed: R/J • Drawn: DAS • Checked: R/J • Approved: R/J

**CLEANING OF CLOGGED BRIDGES/CULVERTS/DITCHES  
SAND COULEE, MONTANA**

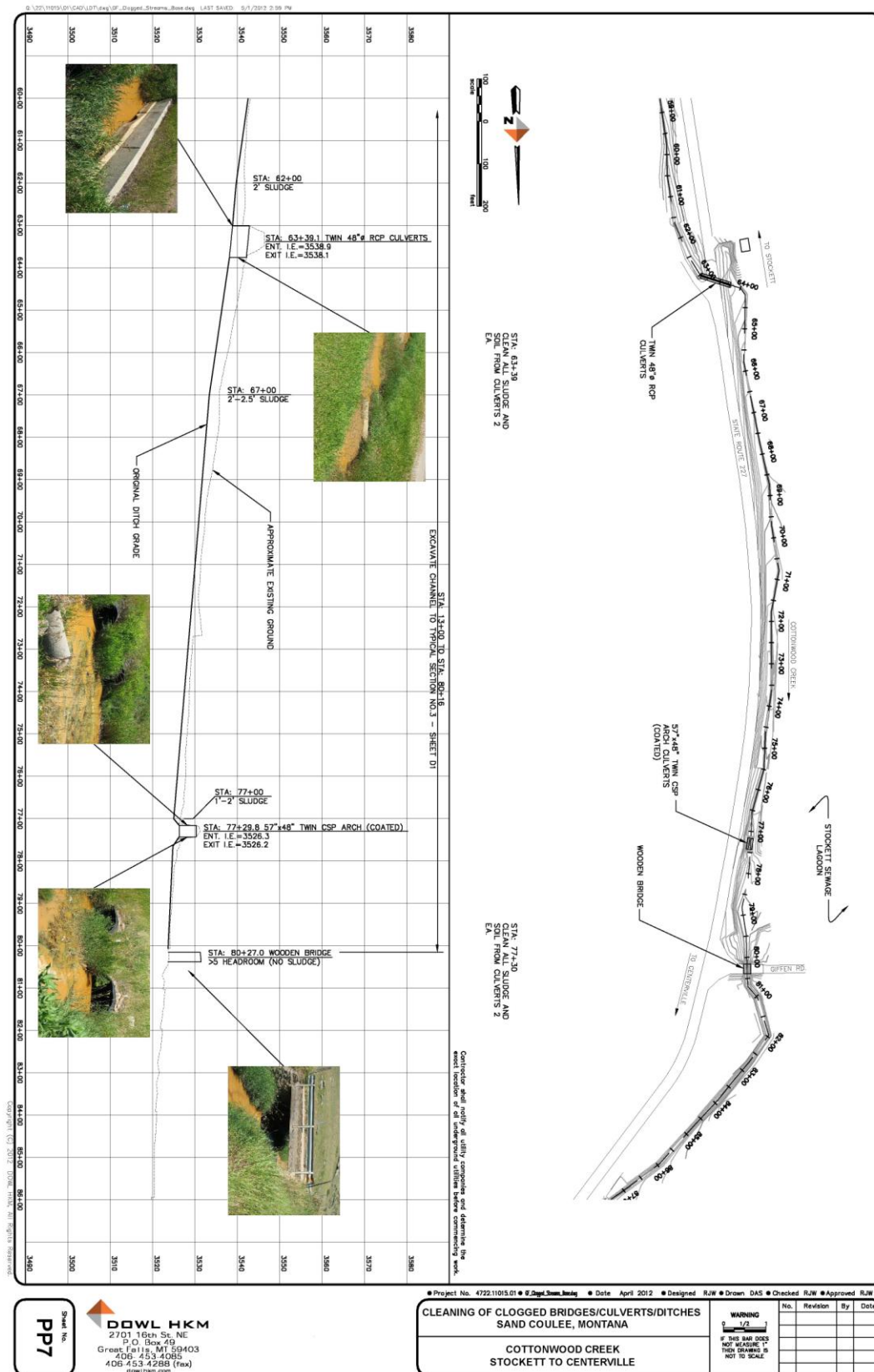
**COTTONWOOD CREEK  
STOCKETT TO CENTERVILLE**

WARNING  
1/2  
IF THIS SIGN DOES  
NOT MEASURE, IT  
IS NOT A SIGN. IT  
IS NOT TO BE  
MOVED.

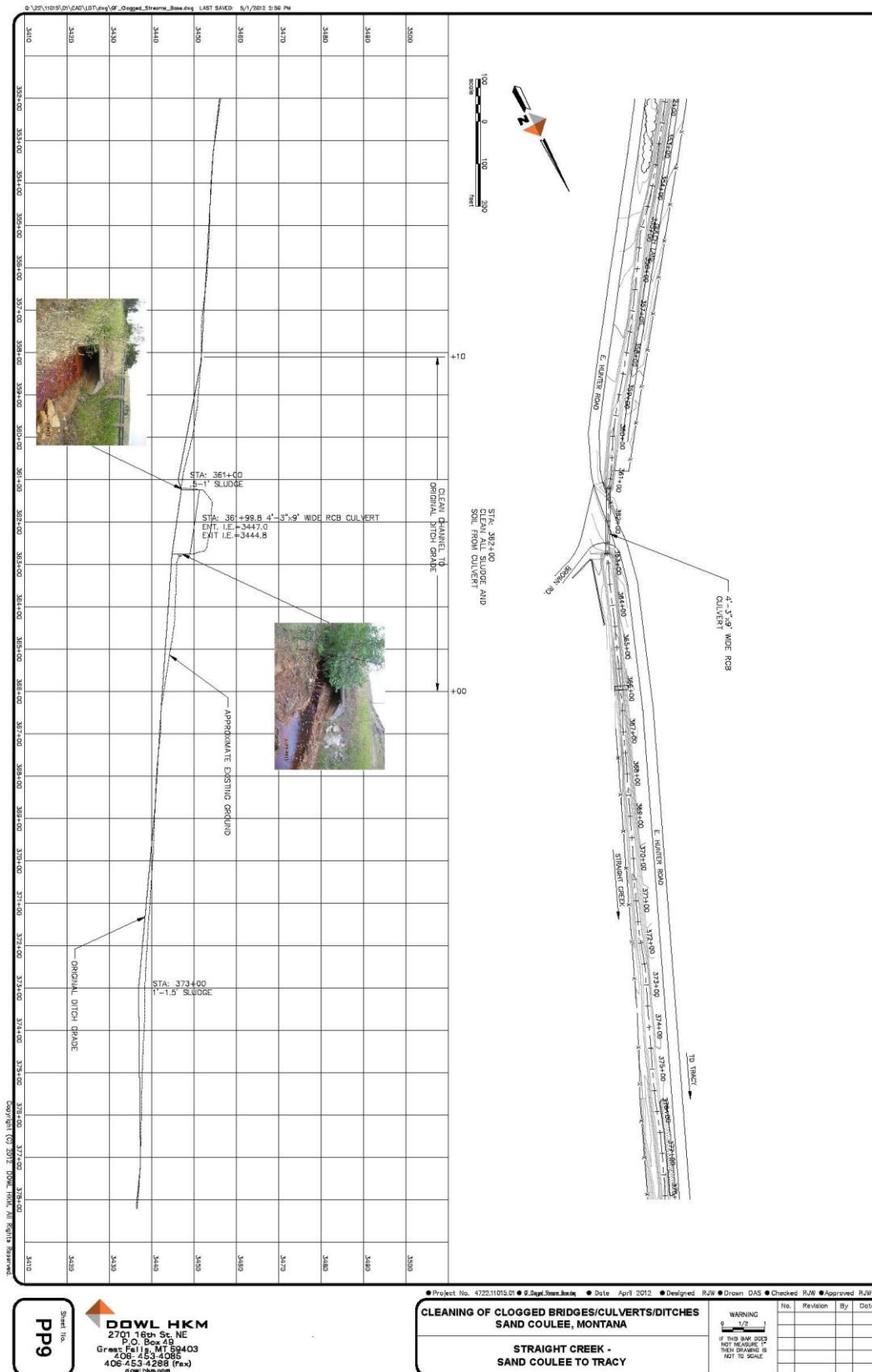
No.	Revision	By	Date











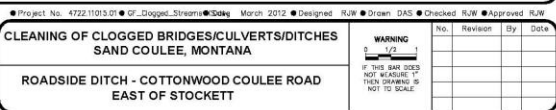


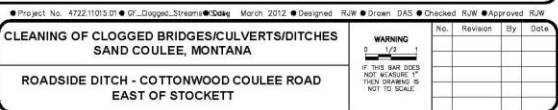


# **Appendix C**

Cross-Sections Corresponding to Plan and Profile Sheets

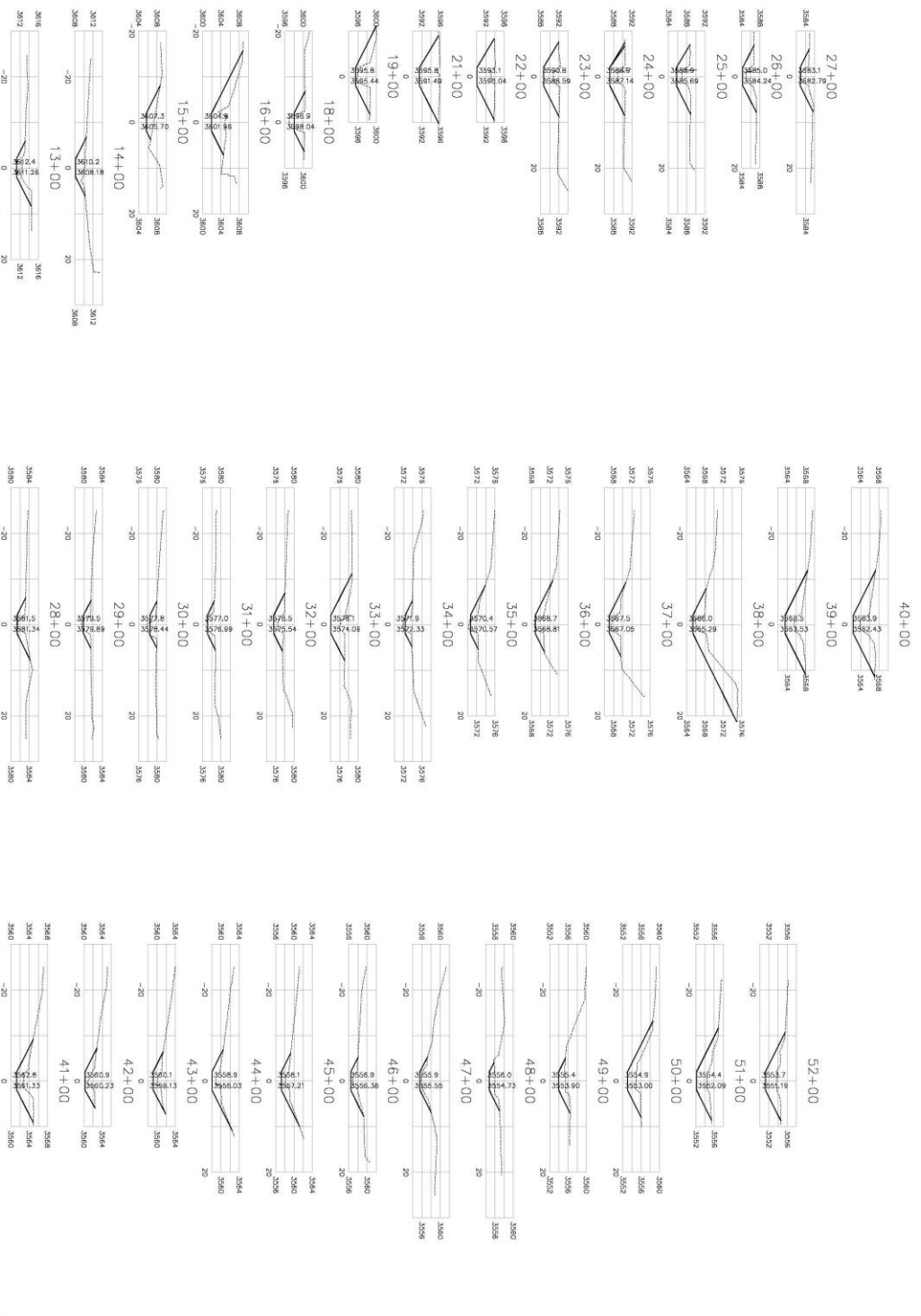












Copyright (C) 2012 DOWL H&M, All Rights Reserved.

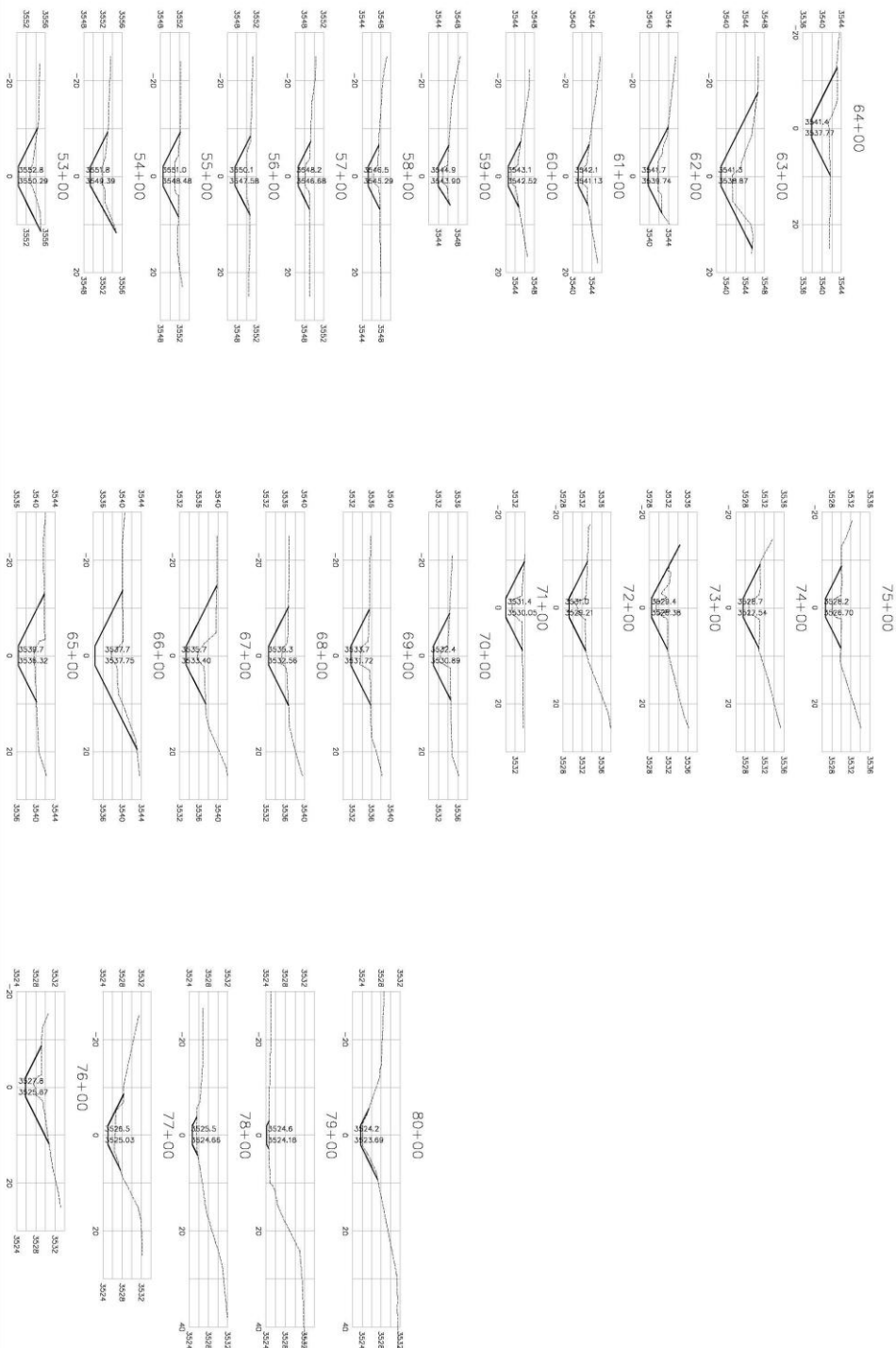


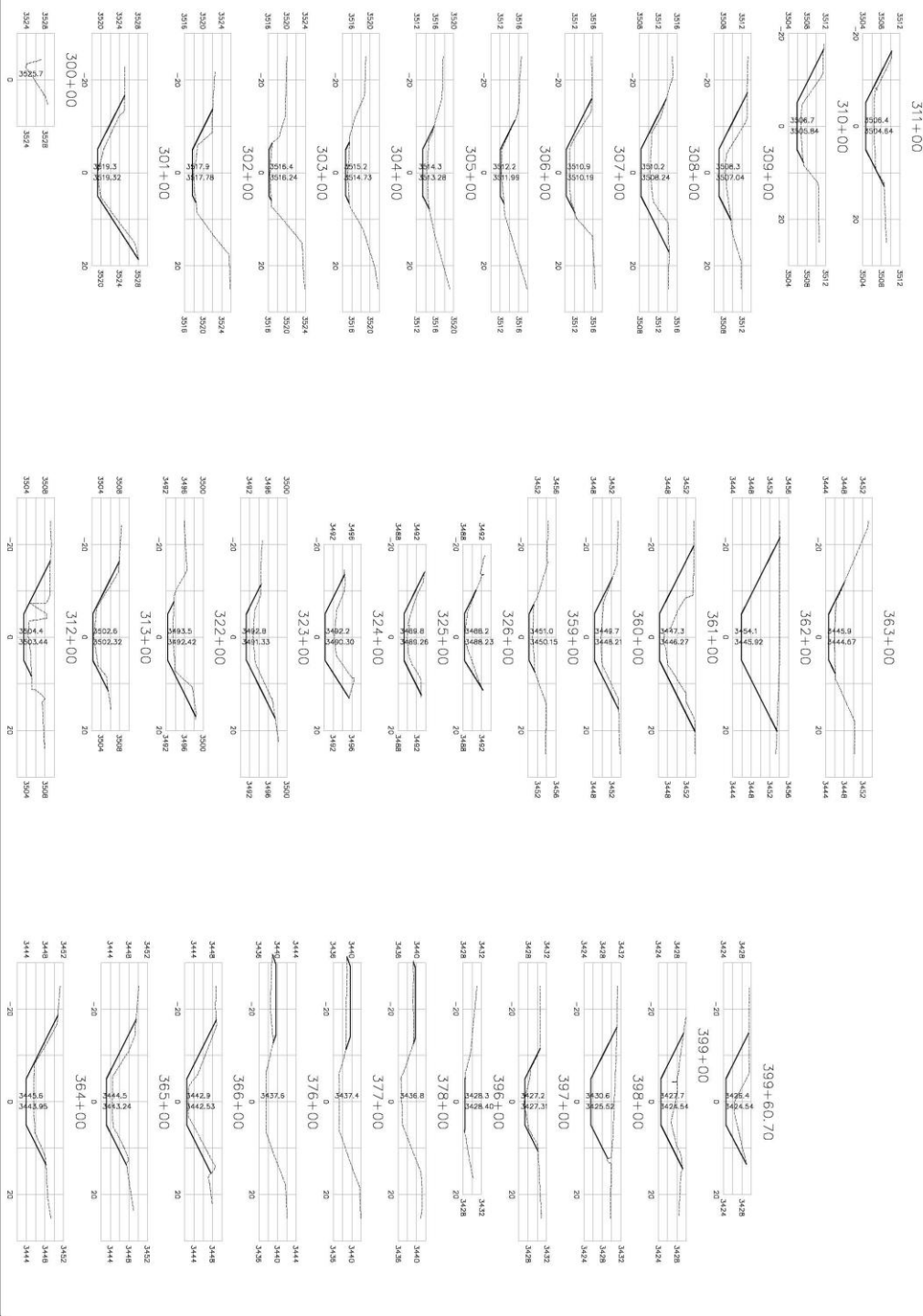
**DOWL H&M**  
2701 E. 5th St.  
P.O. Box 49  
Great Falls, MT 59403  
406-453-4086  
406-453-4289 (fax)  
dowlhnm.com

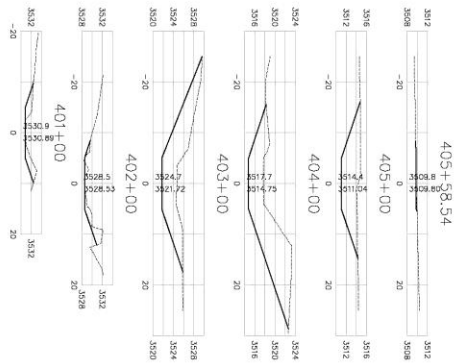
Project No. 4722-11013.07 • Clogged Stream • City of Cottonwood Creek • March 2012 • Designed: R/W • Drawn: DAS • Checked: R/W • Approved: R/W  
**CLEANING OF CLOGGED BRIDGES/CULVERTS/DITCHES  
SAND COULEE, MONTANA**  
**COTTONWOOD CREEK -  
STOCKETT TO CENTERVILLE**



No.	Revision	By	Date







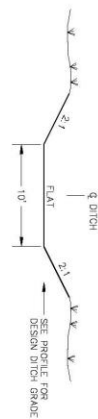
**XS7**

 **DOWL HKM**  
2701 16TH ST. NE  
P.O. BOX 49  
GREAT FALLS, MT 59403  
406-453-4085  
406-453-4288 (FAX)  
DOWLHKM.COM

\*Project No. 4722.1010107 \*C-Dogleg Stream \*SDAG March 2012 \*Designed RLB \*Drawn DAS \*Checked RLB \*Approved RLB  
**CLEANING OF CLOGGED BRIDGES/CULVERTS/DITCHES  
 SAND COULEE, MONTANA**  
  
**NATIONAL MINE TO  
 STRAIGHT CREEK**

# **Appendix D**

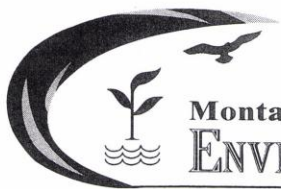
Details of Typical Cross-Sections



## **Appendix E**

Copy of State Historic Preservation Office Consultation





Montana Department of  
ENVIRONMENTAL QUALITY

P.O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • www.deq.mt.gov

RECEIVED

FEB 27 2012

BY: SHPO

Brian Schweitzer, Governor

February 24, 2012

Josef Warhank  
State Historic Preservation Office  
1310 8<sup>th</sup> Avenue, P.O. Box 201202  
Helena, MT 59620

CONCUR  
MONTANA SHPO  
DATE 28 Feb 2012 SIGNED *Josef Warhank*

JOSEF  
DEQ/AMR  
SAND COULEE  
& STOCKETT  
COAL MINE  
DISCHARGE  
RECLAMATION

RE: SHPO Project Number 2012021003  
Update to Project Correspondence

Dear Josef:

This letter is to supplement the previous consultation on the DEQ Abandoned Mine Program's plan for removing sludges and precipitates from stream channels, culverts, and bridges in the vicinity of historic abandoned coal mines near the communities of Stockett, Sand Coulee and Tracy. The cultural resource inventories provided were produced for the abandoned mine reclamation program back in the 1980s when reclamation work was performed on these mines.

The work that DEQ is performing at this time is not directly on the coal mine sites, but is rather on the stream channels downstream from the mines. The work proposed is to be confined to streams, bridges and culverts where work previously took place in the 1980s. The work will consist of maintenance on bridges, culverts, and reconstructed stream channels, all of which are less than 50 years old. Please see the attached road log which shows photos of the areas where work is proposed under this project.

As the work will not be addressing mines directly, but instead stream channels, bridges and culverts constructed during the 1980s, DEQ has concluded that no historic properties will be affected by this undertaking. DEQ requests SHPO's concurrence with that finding.

Sincerely,

*John Koerth*  
John Koerth  
Chief, Abandoned Mines Bureau  
Remediation Division

RECEIVED  
FEB 29 2012  
SHPO  
Remediation Division

## **Appendix F**

Montana Fish, Wildlife, and Parks Findings



## Montana Fish, Wildlife & Parks

15 March 2012

4600 Giant Springs Road  
Great Falls, MT 59405  
Phone (406) 454-5853

Hayden Janssen  
Montana Department of Environmental Quality  
P.O. Box 200901  
Helena, Mt. 59620

Subject: Permit No.: DEQ-1-12  
Waterbody: Cottonwood Creek, sand Coulee Creek, Straight Creek  
Project Name: GREAT FALLS COAL FIELD CLOGGED STREAMS  
ABANDONED MINE LANDS PROJECT  
Water Code: 17-0000, 17-6432, 17-0000  
Legal Description: T19N, R4E, S36 ff

Relative to the Montana Stream Protection Act, we have completed our review of the proposed project to remove hazardous metal and precipitate accumulations from the waterways and ditches near Sand Coulee, Stockett, and Tracy caused by historic mining practices. The project has been approved with the following special conditions:

1. All work shall be completed in an expeditious manner to avoid unnecessary impacts to all three streams;
2. Extra precautions shall be taken to preserve existing riparian vegetation. Clearing of vegetation will be limited to that which is absolutely necessary for construction of the project. All disturbed areas are to be revegetated. Any established shrubs or grass mats that need to be removed should be removed with an excavator and replaced on the newly contoured stream banks. If disturbed stream banks are located in area with toxic soils, you are required to stabilize raw banks with hydro mulch, fiber matting or slash windrows;
3. All construction activities performed in the stream and immediate vicinity, shall be conducted in a manner to reduce in-stream turbidity along with minimizing disturbances to the streambed and/or stream bank;
4. The use of mechanized equipment in the watercourse shall be avoided unless specifically authorized under the Montana Stream Protection Act, 87-5-501, et seq., MCA. No culvert or bridge replacements were identified in the application

RECEIVED

MAR 16 2012

Dept. of Environmental Quality  
Remediation Division

therefore, in stream work is allowed only to remove toxic soils throughout the proposed 12, 950 foot linear reach;

5. All streambank and adjacent areas disturbed by the construction activity shall be protected with temporary erosion control measures during and after the construction activities. Functional silt fence, staked straw bales, geotextile fabric, or slash windrows shall be installed to prevent sediment delivery the stream. Disturbed areas shall be reclaimed with long-term erosion control measures, seeded, and revegetated immediately after construction. See item 2 for specific conditions outlined for stabilizing areas with toxic soils;
6. Any excess or excavated materials generated from this project must be disposed of above the ordinary high water mark and not in an area classified as a wetland. Clean fill material should be used for any fill on the streambank or below water level. Supplemental information supplied to this department by email on March 12, 2012 indicates approximately 13,000 yds<sup>3</sup> of toxic material will be removed and transported to a repository site;
7. Staging areas for storage of construction material are required to be located at least 50 feet horizontally from the edge of the stream at the highest water level anticipated during the construction period. A buffer zone of natural ground cover 50-feet wide shall be maintained between any equipment and materials storage areas and the streambank to control runoff, protect the stream bank, and retain sediment.

NOTE: This permit is valid for **one year** from the date of the permit.

**I have reviewed the above project on behalf of the Montana Department of Environmental Quality (DEQ)** pursuant to the Montana Water Quality Short-term Water Quality Standards for Turbidity 75-5-318 MCA:

- ☐ This project **will not** increase turbidity if completed according to the conditions listed in the 310 or 124 permit. Therefore, application to DEQ for a 318 authorization **is not** required.
- ☒ Impacts to the physical and biological environment from turbidity generated as a result of this project are uncertain. Therefore, the applicant must contact the Montana Department of Environmental Quality, 1520 East Sixth Avenue, Box 200901, Helena, MT 59620-0901, (406 444-3080) to determine project specific narrative conditions required to meet short-term water quality standards and protect aquatic biota.
- ☐ Turbidity generated from this project is expected to be short-term and have only temporary and minor impacts on the physical and biological environment. Therefore, compliance with the conditions stated in ***DEQ's Short Term Water Quality Standard for Turbidity Related to Construction Activity***, as well as other conditions listed in the 310 or 124 permit, are appropriate for this project.

Sincerely,



Grant Grisak  
Fisheries Biologist

c: Jim Darling

## **Appendix G**

April 2011 Road Log with Montana Department of Transportation Personnel



OSM Definition of a “Clogged Stream”:

Abandoned mine related sediment or precipitate filled stream bed; a situation where there is a high probability of flooding caused by abandoned mine related sediments or precipitates filling or aggrading a stream bed thus causing the stream bed to lose its carrying capacity.

## **Road Log of Clogged Culverts and Bridges April 2011:**

### **Clogged Streams Segment 1: Cottonwood Creek in Cottonwood Coulee from #6 Mine Discharge above Stockett to Junction with HWY 227.**

**0.0 Mile.** Start log up Cottonwood Coulee Road 1.57 miles from intersection with State Route 227: Discharge from abandoned Cottonwood Coal Company #6 mine. Mine discharge is directed across hillside above road to roadside ditch in an attempt to protect Stockett community water source. Infiltration gallery for community system is located slightly upstream across Cottonwood Creek. Cottonwood #6 mine is USGS OFR98-94 site #7.

**0.3** Flooded/ponded area- mine discharge seepage under road.

**0.5** Flooded/ponded wide area along roadside ditch – seepage area under road.

**1.0** Culvert-roadside ditch crosses over to creek side. Receiving ditch is perched along hillside below road to keep mine drainage from mixing directly with stream.

**1.0** Start seepage burnout area for #1 & #2 mines. Sedimentation and mine seepage discharge.



**1.1.** After crossing hump, north-side roadside ditch starts again. Mine seepage on hillsides along both sides of Cottonwood Coulee continues from #1 and #2 coal mines [Cottonwood Seeps].

**1.5** Junction State Route 227. County road culvert with Cottonwood Creek crossing Cottonwood Coulee Road, flowing north. Culvert clogged with metals precipitation from #2 Mine discharge in Ladd Coulee.

END SEGMENT ONE.



**Clogged Streams Segment 2. State Route 227 from Town of Stockett to Town of Tracy.**

**0.0 Mile. Start:** Start at bus turnaround in Ladd Coulee, southern end of Stockett.

**0.1** Sloughing into roadside ditch from seepage area below #2 Mine.



**0.2** Discharge from #2 Mine enters surface water. USGS OFR98-94 site #8.

**0.3** Cottonwood Coulee Road. Culvert is plugged under Cottonwood Coulee Road.

**0.4** Cottonwood Creek was flooding in a residential area due to filled channel capacity. In 2010 high water pushed the stream out-of-channel where it pooled on the street in front of houses on Dewey Ave.





**0.6** Bridge at Dewey Avenue, Stockett. County Road Bridge crosses Cottonwood Creek. Waterway beneath bridge is blocked with sediment, resulting in a limited passage for the stream. High water in spring 2010 inundated the bridge.



**0.8** Madison limestone outcrop along east side of 227. Geologic feature may add neutralizing potential to the stream and account for increased aggradation of the channel below the limestone outcrop.

**1.2** Plugged Culvert. Cottonwood Creek crosses to the West side of the road. Clogging of the culvert has resulted from the aggraded stream bottom downstream from these culverts. These are twin concrete culverts and are located at 3 Rivers Telephone Building.



**1.4** USGS gauging station for Cottonwood Creek. USGS OFR98-94 site #2.

**1.5** Highway approach to Stockett sewer lagoon. Stream sediments upstream of culverts have been excavated and the channel deepened by approximately 18" to mitigate culvert plugging.



**1.6** Giffen Coulee Road intersection, #5 Coulee. Giffen mine is upstream from this point. Giffen Coulee provides additional water and metal load to Cottonwood Coulee from the abandoned Giffen Mine.

**1.8** Culvert crosses road to east. Cottonwood Creek is now on the east side of 227. Debris blockage observable.



**2.6** Abandoned Guisti mine. Residential area. Discharge of mine water and sediment from west hillside to culvert under road. This yields an unstable drainage channel with sedimentation, erosion, and seepage from the mine.



**2.8** Abandoned Stainsby and Latham Mine. West side of Route 227. Discharge from west hillside to culvert under road. Sedimentation from mine drainage prevents vegetation from establishing, which would stabilize the channel down slope.



**3.1** Centerville. Bar, church, school, residences and senior center. Confluence of Cottonwood Creek with Sand Coulee Creek. Stream is Sand Coulee Creek below Centerville. USGS OFR98-94 sites #1 & 17.

**4.3** Sand Coulee cutoff road.

**5.0** Tracy: Two sets of plugged culverts. Twin, 4'x8' box culverts beneath 227 are plugged, as is the culvert beneath the county road leading into Tracy. Bridge culverts were installed in 1984.



### **Clogged Streams: Segment 3. East Hunter Road from south of Sand Coulee to Tracy.**

**0.0 Start:** East Hunter Road. South edge of Sand Coulee – Shack Town. Straight Creek – “Rusty Ditch.” Culvert located at Miners Coulee/Straight Creek confluence. Culvert under county road is not plugged. AMD discharges from Miners Coulee and Straight Creek flow into this culvert.



**0.1 “Kate’s Coulee” discharges to Straight Creek. Culvert under Shack Town road also plugged. Drainage from the National/Mount Oregon and Gerber Mines discharge into “Kate’s Coulee.”**



**0.2 Bridge – Finn Hall. Straight Creek filled with ferric hydroxide precipitates above bridge.**





**0.4 Bridge - #8 Mine (Nelson #2)**

**0.5 Bridge – Fire Hall**

**0.8 Bridge – Post Office**

**1.1 Culvert under East Hunter Road at north end of Sand Coulee.**



**1.8 Tracy Culverts. Plugged. Sand Coulee Creek below Tracy clogged with metal precipitates.**  
See mile 5.0 for Stockett to Tracy stream segment.



**1.9** Tracy Bridge. County road bridge across Sand Coulee Creek. Access to community of Tracy. Last photo shows condition of Sand Coulee Creek below county bridge into Tracy.

## **Appendix H**

Laboratory Results and Chemical Analyses from Samples taken



www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

## ANALYTICAL SUMMARY REPORT

June 01, 2011

MT DEQ-Abandoned Mines  
PO Box 200901  
Helena, MT 59620-0901

Workorder No.: H11050271

Project Name: Sand Coulee Cottonwood Clogged Streams

Energy Laboratories Inc Helena MT received the following 11 samples for MT DEQ-Abandoned Mines on 5/18/2011 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
H11050271-001	CS-01-SS	05/17/11 15:30	05/18/11	Soil	Metals by ICP/ICPMS, Total Metals by ICP/ICPMS, Total Acid/Base Potential Mercury, TCLP Mercury in Solid By CVAA Lime Requirement, SMP Buffer pH, Saturated Paste Digestion, Total Metals Digestion, Mercury by CVAA Lime Percentage Saturated Paste Extraction Sulfur Forms TCLP Extraction, Non-volatiles
H11050271-002	CS-02-SS	05/17/11 15:40	05/18/11	Soil	Same As Above
H11050271-003	CS-03-SS	05/17/11 15:45	05/18/11	Soil	Same As Above
H11050271-004	CS-04-SS	05/17/11 15:48	05/18/11	Soil	Same As Above
H11050271-005	CS-05-SS	05/17/11 16:02	05/18/11	Soil	Same As Above
H11050271-006	CS-06-SS	05/17/11 16:15	05/18/11	Soil	Same As Above
H11050271-007	CS-07-SS	05/17/11 17:00	05/18/11	Soil	Same As Above
H11050271-008	CS-08-SS	05/17/11 17:20	05/18/11	Soil	Same As Above
H11050271-009	CS-09-SS	05/17/11 17:35	05/18/11	Soil	Same As Above
H11050271-010	CS-10-SS	05/17/11 17:40	05/18/11	Soil	Same As Above
H11050271-011	CS-11-SS	05/17/11 17:42	05/18/11	Soil	Same As Above

This report was prepared by Energy Laboratories, Inc., 3161 E. Lyndale Ave., Helena, MT 59604. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

If you have any questions regarding these test results, please call.

Report Approved By:

*Wanda Johnson*  
Login Supervisor

Digitally signed by  
Wanda Johnson

Date: 2011.06.01 14:15:13 -06:00





www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

**CLIENT:** MT DEQ-Abandoned Mines  
**Project:** Sand Coulee Cottonwood Clogged Streams  
**Sample Delivery Group:** H11050271

**Report Date:** 06/01/11

## **CASE NARRATIVE**

Tests associated with analyst identified as ELI-B were subcontracted to Energy Laboratories, 1120 S. 27th St., Billings, MT, EPA Number MT00005.



www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

**LABORATORY ANALYTICAL REPORT**  
Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines  
**Project:** Sand Coulee Cottonwood Clogged Streams  
**Workorder:** H11050271

**Report Date:** 06/01/11  
**Date Received:** 05/18/11

Sample ID	Client Sample ID	Analysis		pH, SMP Buffer	Lime Requireme	pH-Sat Pst	Neut Potential	Acid Potential	Acid/Base Potential	Sulfur, Total	Sulfur, Hot Water	Sulfur, HCl Extractable	Sulfur, HNO3	Sulfur, Residual
		Units		Tons/1000T	Tons/1000T	s_u_	t/t	t/t	t/t	%	%	%	%	%
		Up	Low	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
H11050271-001	CS-01-SS	0	0	4.3	19	3.0	1	14	-13	1.8	0.34	0.95	0.46	0.02
H11050271-002	CS-02-SS	0	0	4.7	16	3.5	0	9.7	-10	0.91	0.18	0.40	0.31	0.02
H11050271-003	CS-03-SS	0	0	4.5	18	4.0	0	3.8	-4	1.6	0.68	0.78	0.12	< 0.01
H11050271-004	CS-04-SS	0	0	3.9	22	8.8	-5	18	-23	1.3	0.09	0.52	0.98	0.08
H11050271-005	CS-05-SS	0	0	6.4	3	5.0	0	3.1	-4	0.40	0.02	0.27	0.10	0.01
H11050271-006	CS-06-SS	0	0	6.4	3	6.5	7	6.1	1	1.4	0.11	1.0	0.19	0.03
H11050271-007	CS-07-SS	0	0	4.1	21	3.0	-7	48	-55	2.5	0.08	0.83	1.5	0.05
H11050271-008	CS-08-SS	0	0	2.9	29	2.8	-18	14	-32	4.1	0.52	3.0	0.45	0.09
H11050271-009	CS-09-SS	0	0	4.1	21	3.2	-5	12	-16	1.0	0.13	0.40	0.98	0.12
H11050271-010	CS-10-SS	0	0	2.9	29	2.6	-27	62	-89	5.0	0.59	2.3	2.0	0.07
H11050271-011	CS-11-SS	0	0	5.5	10	2.8	-4	7.1	-12	1.0	0.04	0.49	0.23	0.28



www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

**LABORATORY ANALYTICAL REPORT**  
Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines  
**Project:** Sand Coulee Cottonwood Clogged Streams  
**Workorder:** HI1050271

**Report Date:** 06/01/11  
**Date Received:** 05/18/11

Sample ID	Client Sample ID	Analysis		As-T	Ba-T	Cd-T	Co-T	Cr-T	Cu-T	Fe-T	Mn-T	Ni-T	Pb-T	Sb-T
		Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		Up	Low	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
HI1050271-001	CS-01-SS	0	0	7	74	< 1	6	5	13	124000	28	9	< 5	< 5
HI1050271-002	CS-02-SS	0	0	7	130	< 1	6	9	18	53000	73	11	7	< 5
HI1050271-003	CS-03-SS	0	0	9	181	< 1	17	15	22	27400	274	37	10	< 5
HI1050271-004	CS-04-SS	0	0	10	115	< 1	5	7	19	82200	31	8	11	< 5
HI1050271-005	CS-05-SS	0	0	10	137	< 1	25	10	31	54200	89	51	10	< 5
HI1050271-006	CS-06-SS	0	0	< 5	85	1	19	6	11	27400	51	41	< 5	< 5
HI1050271-007	CS-07-SS	0	0	25	111	< 1	< 5	8	7	134000	21	< 5	10	< 5
HI1050271-008	CS-08-SS	0	0	7	39	< 1	< 5	9	< 5	72800	8	< 5	< 5	< 5
HI1050271-009	CS-09-SS	0	0	15	136	< 1	< 5	11	20	65400	48	11	16	< 5
HI1050271-010	CS-10-SS	0	0	< 5	7	< 1	< 5	8	< 5	36200	< 5	< 5	< 5	< 5
HI1050271-011	CS-11-SS	0	0	28	83	< 1	< 5	10	33	130000	36	< 5	24	< 5



www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

**LABORATORY ANALYTICAL REPORT**  
Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines  
**Project:** Sand Coulee Cottonwood Clogged Streams  
**Workorder:** HI1050271

**Report Date:** 06/01/11  
**Date Received:** 05/18/11

Sample ID	Client Sample ID	Analysis		Sr-T	Zn-T	Hg, Total	As	Ba	Cd	Cr	Pb	Hg	Ag	Se
		Units		mg/kg	mg/kg	mg/kg	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
		Up	Low	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
HI1050271-001	CS-01-SS	0	0	40	106	< 0.50	< 0.5	< 10	< 0.1	< 0.5	< 0.5	< 0.02	< 0.5	< 0.1
HI1050271-002	CS-02-SS	0	0	28	97	< 0.50	< 0.5	< 10	< 0.1	< 0.5	< 0.5	< 0.02	< 0.5	< 0.1
HI1050271-003	CS-03-SS	0	0	29	174	< 0.50	< 0.5	< 10	< 0.1	< 0.5	< 0.5	< 0.02	< 0.5	< 0.1
HI1050271-004	CS-04-SS	0	0	31	102	< 0.50	< 0.5	< 10	< 0.1	< 0.5	< 0.5	< 0.02	< 0.5	< 0.1
HI1050271-005	CS-05-SS	0	0	25	278	< 0.50	< 0.5	< 10	< 0.1	< 0.5	< 0.5	< 0.02	< 0.5	< 0.1
HI1050271-006	CS-06-SS	0	0	15	325	< 0.50	< 0.5	< 10	< 0.1	< 0.5	< 0.5	< 0.02	< 0.5	< 0.1
HI1050271-007	CS-07-SS	0	0	18	49	< 0.50	< 0.5	< 10	< 0.1	< 0.5	< 0.5	< 0.02	< 0.5	< 0.1
HI1050271-008	CS-08-SS	0	0	6	14	< 0.50	< 0.5	< 10	< 0.1	< 0.5	< 0.5	< 0.02	< 0.5	< 0.1
HI1050271-009	CS-09-SS	0	0	23	80	< 0.50	< 0.5	< 10	< 0.1	< 0.5	< 0.5	< 0.02	< 0.5	< 0.1
HI1050271-010	CS-10-SS	0	0	< 5	8	< 0.50	< 0.5	< 10	< 0.1	< 0.5	< 0.5	< 0.02	< 0.5	< 0.1
HI1050271-011	CS-11-SS	0	0	31	78	< 0.50	< 0.5	< 10	< 0.1	< 0.5	< 0.5	< 0.02	< 0.5	< 0.1



www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

## QA/QC Summary Report

Prepared by Helena, MT Branch

Client: MT DEQ-Abandoned Mines

Report Date: 06/01/11

Project: Sand Coulee Cottonwood Clogged Streams

Work Order: H11050271

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: ASA12-3 Analytical Run: MISC SOILS_110520F										
Sample ID: ICV Initial Calibration Verification Standard 05/20/11 08:54										
pH, SMP Buffer		7.04	Tons/1000T	0.10	101	90	110			
Method: ASA12-3 Batch: R71152										
Sample ID: ICV1 Initial Calibration Verification Standard Run: MISC SOILS_110520F 05/20/11 08:54										
pH, SMP Buffer		10.0	Tons/1000T	0.10	100	90	110			
Sample ID: LCS Laboratory Control Sample Run: MISC SOILS_110520F 05/20/11 08:54										
pH, SMP Buffer		7.49	Tons/1000T	0.10	99	70	130			
Sample ID: H11050271-002ADUP 2 Sample Duplicate Run: MISC SOILS_110520F 05/20/11 08:54										
pH, SMP Buffer		4.80	Tons/1000T	0.10						
Lime Requirement, SMP buffer		15.6	Tons/1000T	1.0				5.0	30	

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

## QA/QC Summary Report

Prepared by Helena, MT Branch

Client: MT DEQ-Abandoned Mines

Report Date: 06/01/11

Project: Sand Coulee Cottonwood Clogged Streams

Work Order: H11050271

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: ASAM10-3.2		Analytical Run: MISC SOILS_110520B								
Sample ID: CCV_1_110519_1	Continuing Calibration Verification Standard									05/20/11 07:12
pH, sat. paste	7.03	s.u.	0.10	100	95	105				
Sample ID: CCV1_1_110519_1	Continuing Calibration Verification Standard									05/20/11 07:12
pH, sat. paste	4.01	s.u.	0.10	100	95	105				
Sample ID: ICV_1_110519_1	Initial Calibration Verification Standard									05/20/11 07:13
pH, sat. paste	9.98	s.u.	0.10	100	98	102				
Sample ID: CCV_3_110519_1	Continuing Calibration Verification Standard									05/20/11 07:35
pH, sat. paste	7.02	s.u.	0.10	100	95	105				
Method: ASAM10-3.2										Batch: 12265
Sample ID: LCS_1_110519_1	Laboratory Control Sample					Run: MISC SOILS_110520B				05/20/11 07:28
pH, sat. paste	7.46	s.u.	0.10	102	90	110				
Sample ID: H11050271-002ADUP	Sample Duplicate					Run: MISC SOILS_110520B				05/20/11 07:30
pH, sat. paste	3.48	s.u.	0.10				0.0	30		

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

## QA/QC Summary Report

Prepared by Helena, MT Branch

Client: MT DEQ-Abandoned Mines

Report Date: 06/01/11

Project: Sand Coulee Cottonwood Clogged Streams

Work Order: H11050271

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7		Analytical Run: ICP1-HE_110524B								
Sample ID: ICV		12 Initial Calibration Verification Standard								05/24/11 15:13
Antimony		0.786	mg/L	0.050	98	90	110			
Arsenic		0.777	mg/L	0.020	97	90	110			
Barium		0.792	mg/L	0.10	99	90	110			
Cadmium		0.393	mg/L	0.0020	98	90	110			
Chromium		0.789	mg/L	0.010	99	90	110			
Cobalt		0.815	mg/L	0.010	102	90	110			
Copper		0.781	mg/L	0.010	98	90	110			
Lead		0.835	mg/L	0.010	104	90	110			
Manganese		3.98	mg/L	0.010	100	90	110			
Nickel		0.808	mg/L	0.010	101	90	110			
Strontium		0.799	mg/L	0.10	100	90	110			
Zinc		0.794	mg/L	0.010	99	90	110			
Sample ID: ICSA		12 Interference Check Sample A								05/24/11 15:28
Antimony		0.0167	mg/L	0.050		0	0			
Arsenic		0.00110	mg/L	0.020		0	0			
Barium		0.00300	mg/L	0.10		0	0			
Cadmium		-0.00590	mg/L	0.0020		0	0			
Chromium		-0.00100	mg/L	0.010		0	0			
Cobalt		-0.000700	mg/L	0.010		0	0			
Copper		0.00160	mg/L	0.010		0	0			
Lead		0.00440	mg/L	0.010		0	0			
Manganese		0.00210	mg/L	0.010		0	0			
Nickel		0.0668	mg/L	0.010		0	0			
Strontium		0.0289	mg/L	0.10		0	0			
Zinc		-0.00270	mg/L	0.010		0	0			
Sample ID: ICSAB		12 Interference Check Sample AB								05/24/11 15:31
Antimony		1.04	mg/L	0.050	104	80	120			
Arsenic		1.03	mg/L	0.020	103	80	120			
Barium		0.509	mg/L	0.10	102	80	120			
Cadmium		0.961	mg/L	0.0020	96	80	120			
Chromium		0.509	mg/L	0.010	102	80	120			
Cobalt		0.509	mg/L	0.010	102	80	120			
Copper		0.535	mg/L	0.010	107	80	120			
Lead		1.03	mg/L	0.010	103	80	120			
Manganese		0.505	mg/L	0.010	101	80	120			
Nickel		1.07	mg/L	0.010	107	80	120			
Strontium		1.07	mg/L	0.10	107	80	120			
Zinc		0.979	mg/L	0.010	98	80	120			

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

## QA/QC Summary Report

Prepared by Helena, MT Branch

Client: MT DEQ-Abandoned Mines

Report Date: 06/01/11

Project: Sand Coulee Cottonwood Clogged Streams

Work Order: H11050271

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7		Analytical Run: ICP1-HE_110525A								
Sample ID: ICV		Initial Calibration Verification Standard								
Iron		4.01	mg/L	0.030	100	90	110			05/25/11 14:27
Sample ID: ICSA		Interference Check Sample A								
Iron		182	mg/L	0.030	91	80	120			05/25/11 15:24
Sample ID: ICSAB		Interference Check Sample AB								
Iron		185	mg/L	0.030	93	80	120			05/25/11 15:27

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.





www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-680-2218

## QA/QC Summary Report

Prepared by Helena, MT Branch

Client: MT DEQ-Abandoned Mines

Report Date: 06/01/11

Project: Sand Coulee Cottonwood Clogged Streams

Work Order: H11050271

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: Sobek Modified</b>										Batch: R71247
<b>Sample ID: LCS1105241321</b>	5	Laboratory Control Sample				Run: LECO632_110525A				05/24/11 13:21
Sulfur, Total		0.64	%	0.010	88	90	110			S
Sulfur, Hot Water Extractable		0.16	%	0.010	83	77	123			
Sulfur, HCl Extractable		0.14	%	0.010	160	52	148			S
Sulfur, HNO3 Extractable		0.17	%	0.010	74	69	131			
Sulfur, Residual		0.17	%	0.010	77	82	118			S
<b>Sample ID: H11050271-002A</b>										05/24/11 13:53
	5	Sample Duplicate				Run: LECO632_110525A				
Sulfur, Total		0.95	%	0.010				4.6	30	
Sulfur, Hot Water Extractable		0.22	%	0.010				21	30	
Sulfur, HCl Extractable		0.43	%	0.010				6.7	30	
Sulfur, HNO3 Extractable		0.29	%	0.010				8.3	30	
Sulfur, Residual		0.016	%	0.010				15	30	
<b>Method: Sobek Modified</b>										Batch: 12264
<b>Sample ID: LCS-12264</b>		Laboratory Control Sample				Run: MAN-TECH_110519A				05/19/11 13:12
Neutralization Potential		64	t/kt		95	70	130			
<b>Method: Sobek Modified</b>										Batch: 12264
<b>Sample ID: LCS-12264</b>		Laboratory Control Sample				Run: MAN-TECH_110519C				05/19/11 14:56
Neutralization Potential		61	t/kt		90	70	130			
<b>Method: Sobek Modified</b>										Batch: 12264
<b>Sample ID: LCS-12264</b>		Laboratory Control Sample				Run: MAN-TECH_110520A				05/20/11 07:14
Neutralization Potential		64	t/kt		94	70	130			
<b>Sample ID: H11050271-002ADUP</b>										05/20/11 07:30
		Sample Duplicate				Run: MAN-TECH_110520A				
Neutralization Potential		-0.060	t/kt					210	20	R
<b>Method: Sobek Modified</b>										Batch: 12264
<b>Sample ID: H11050271-002ADUP</b>	2	Sample Duplicate				Run: MISC SOILS_110523C				05/20/11 07:40
Acid Potential		8.9	t/kt	0.31				8.3	20	
Acid/Base Potential		-9.0	t/kt					7.6	20	

### Qualifiers:

RL - Analyte reporting limit.

R - RPD exceeds advisory limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.



www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-680-2218

## QA/QC Summary Report

Prepared by Helena, MT Branch

Client: MT DEQ-Abandoned Mines

Report Date: 06/01/11

Project: Sand Coulee Cottonwood Clogged Streams

Work Order: H11050271

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: SW6010B</b>										
Batch: 12289										
<b>Sample ID: MB-12289</b>	13	Method Blank				Run: ICP1-HE_110524B				05/24/11 16:56
Antimony		ND	mg/kg	1						
Arsenic		ND	mg/kg	0.5						
Barium		ND	mg/kg	0.03						
Cadmium		ND	mg/kg	0.02						
Chromium		ND	mg/kg	0.1						
Cobalt		ND	mg/kg	0.2						
Copper		ND	mg/kg	0.2						
Iron		ND	mg/kg	3						
Lead		ND	mg/kg	0.4						
Manganese		ND	mg/kg	0.08						
Nickel		ND	mg/kg	0.1						
Strontium		ND	mg/kg	0.05						
Zinc		ND	mg/kg	0.1						
<b>Sample ID: LFB-12289</b>										
Batch: 12289										
13	Laboratory Fortified Blank					Run: ICP1-HE_110524B				05/24/11 16:56
Antimony		46.7	mg/kg	5.0	93	80	120			
Arsenic		45.1	mg/kg	5.0	90	80	120			
Barium		48.4	mg/kg	5.0	97	80	120			
Cadmium		23.4	mg/kg	1.0	94	80	120			
Chromium		49.7	mg/kg	5.0	99	80	120			
Cobalt		49.4	mg/kg	5.0	99	80	120			
Copper		50.8	mg/kg	5.0	102	80	120			
Iron		258	mg/kg	5.0	103	80	120			
Lead		50.0	mg/kg	5.0	100	80	120			
Manganese		248	mg/kg	5.0	99	80	120			
Nickel		50.0	mg/kg	5.0	100	80	120			
Strontium		50.4	mg/kg	5.0	101	80	120			
Zinc		48.4	mg/kg	5.0	97	80	120			
<b>Sample ID: LCS-12289</b>										
Batch: 12289										
13	Laboratory Control Sample					Run: ICP1-HE_110524B				05/24/11 17:02
Antimony		54.8	mg/kg	5.1	44	2.2	92.9			
Arsenic		294	mg/kg	5.0	86	72.3	106.4			
Barium		579	mg/kg	5.0	95	80.6	112.2			
Cadmium		126	mg/kg	1.0	92	73	105.1			
Chromium		74.9	mg/kg	5.0	99	72.8	109.1			
Cobalt		55.3	mg/kg	5.0	97	73.3	103.7			
Copper		273	mg/kg	5.0	98	77.5	109.6			
Iron		20700	mg/kg	16	91	39.6	138.3			
Lead		196	mg/kg	5.0	105	75.9	108.6			
Manganese		381	mg/kg	5.0	104	80.8	115.7			
Nickel		61.5	mg/kg	5.0	101	72.3	103.4			
Strontium		209	mg/kg	5.0	98	77.1	115			
Zinc		208	mg/kg	5.0	98	74.2	109.9			

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

## QA/QC Summary Report

Prepared by Helena, MT Branch

Client: MT DEQ-Abandoned Mines

Report Date: 06/01/11

Project: Sand Coulee Cottonwood Clogged Streams

Work Order: H11050271

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW6010B										Batch: 12289
Sample ID: H11050271-011AMS		13 Sample Matrix Spike		Run: ICP1-HE_110524B				05/24/11 17:57		
Antimony		23.2	mg/kg	5.1	46	75	125			S
Arsenic		66.0	mg/kg	5.0	76	75	125			
Barium		133	mg/kg	5.0	100	75	125			
Cadmium		22.6	mg/kg	1.0	90	75	125			
Chromium		57.5	mg/kg	5.0	94	75	125			
Cobalt		51.4	mg/kg	5.0	97	75	125			
Copper		77.0	mg/kg	5.0	88	75	125			
Iron		100000	mg/kg	21		75	125			A
Lead		66.4	mg/kg	5.0	84	75	125			
Manganese		269	mg/kg	5.0	93	75	125			
Nickel		53.4	mg/kg	5.0	98	75	125			
Strontium		75.2	mg/kg	5.0	89	75	125			
Zinc		106	mg/kg	5.0	57	75	125			S
Sample ID: H11050271-011AMSD		13 Sample Matrix Spike Duplicate		Run: ICP1-HE_110524B				05/24/11 18:00		
Antimony		20.8	mg/kg	5.1	42	75	125	11	20	S
Arsenic		66.0	mg/kg	5.0	76	75	125	0.0	20	
Barium		132	mg/kg	5.0	98	75	125	0.6	20	
Cadmium		23.7	mg/kg	1.0	95	75	125	4.6	20	
Chromium		59.8	mg/kg	5.0	99	75	125	4.0	20	
Cobalt		53.0	mg/kg	5.0	100	75	125	3.0	20	
Copper		79.9	mg/kg	5.0	93	75	125	3.7	20	
Iron		85500	mg/kg	21		75	125	16	20	A
Lead		74.4	mg/kg	5.0	100	75	125	11	20	
Manganese		269	mg/kg	5.0	93	75	125	0.3	20	
Nickel		55.6	mg/kg	5.0	102	75	125	4.0	20	
Strontium		84.4	mg/kg	5.0	108	75	125	12	20	
Zinc		103	mg/kg	5.0	50	75	125	2.9	20	S

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.

S - Spike recovery outside of advisory limits.



www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

## QA/QC Summary Report

Prepared by Helena, MT Branch

Client: MT DEQ-Abandoned Mines

Report Date: 06/01/11

Project: Sand Coulee Cottonwood Clogged Streams

Work Order: H11050271

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: SW6010B</b>										
Batch: 12289										
<b>Sample ID: MB-12289</b>	13	Method Blank					Run: ICP1-HE_110525A			05/25/11 16:51
Antimony		ND	mg/kg	1						
Arsenic		0.6	mg/kg	0.5						
Barium		0.04	mg/kg	0.03						
Cadmium		0.02	mg/kg	0.02						
Chromium		ND	mg/kg	0.1						
Cobalt		ND	mg/kg	0.2						
Copper		ND	mg/kg	0.2						
Iron		ND	mg/kg	3						
Lead		ND	mg/kg	0.4						
Manganese		ND	mg/kg	0.08						
Nickel		ND	mg/kg	0.1						
Strontium		ND	mg/kg	0.05						
Zinc		ND	mg/kg	0.1						
<b>Sample ID: H11050271-011AMS</b>										
	13	Sample Matrix Spike					Run: ICP1-HE_110525A			05/25/11 17:40
Antimony		ND	mg/kg	51		75	125			S
Arsenic		88.3	mg/kg	27	96	75	125			
Barium		140	mg/kg	5.0	107	75	125			
Cadmium		20.4	mg/kg	1.0	82	75	125			
Chromium		47.0	mg/kg	7.3	94	75	125			
Cobalt		39.3	mg/kg	8.8	79	75	125			
Copper		70.6	mg/kg	9.1	81	75	125			
Iron		100000	mg/kg	160		75	125			A
Lead		57.0	mg/kg	21	114	75	125			
Manganese		268	mg/kg	5.0	93	75	125			
Nickel		51.2	mg/kg	5.6	103	75	125			
Strontium		74.4	mg/kg	5.0	88	75	125			
Zinc		109	mg/kg	7.1	75	75	125			
<b>Sample ID: H11050271-011AMSD</b>										
	13	Sample Matrix Spike Duplicate					Run: ICP1-HE_110525A			05/25/11 17:43
Antimony		ND	mg/kg	51		75	125			S
Arsenic		88.2	mg/kg	27	95	75	125	0.2	20	
Barium		138	mg/kg	5.0	103	75	125	1.4	20	
Cadmium		21.2	mg/kg	1.0	85	75	125	4.0	20	
Chromium		47.7	mg/kg	7.3	95	75	125	1.5	20	
Cobalt		41.2	mg/kg	8.8	82	75	125	4.7	20	
Copper		71.4	mg/kg	9.2	83	75	125	1.1	20	
Iron		85100	mg/kg	160		75	125	16	20	A
Lead		67.4	mg/kg	21	135	75	125	17	20	S
Manganese		267	mg/kg	5.0	93	75	125	0.4	20	
Nickel		48.2	mg/kg	5.6	96	75	125	6.1	20	
Strontium		83.7	mg/kg	5.0	106	75	125	12	20	
Zinc		96.4	mg/kg	7.1	49	75	125	12	20	S

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.

S - Spike recovery outside of advisory limits.



www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-680-2218

## QA/QC Summary Report

Prepared by Helena, MT Branch

Client: MT DEQ-Abandoned Mines

Report Date: 06/01/11

Project: Sand Coulee Cottonwood Clogged Streams

Work Order: H11050271

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW6020										Analytical Run: SUB-B166138
Sample ID: ICSAB-101101C, 11020 7 Interference Check Sample AB										05/25/11 10:31
Arsenic		0.0104	mg/L	0.0010	104	70	130			
Barium		0.000110	mg/L	0.0010		0	0			
Cadmium		0.0113	mg/L	0.0010	113	70	130			
Chromium		0.0208	mg/L	0.0010	104	70	130			
Lead		0.000130	mg/L	0.0010		0	0			
Selenium		0.0104	mg/L	0.0010	104	70	130			
Silver		0.0194	mg/L	0.0010	97	70	130			
Sample ID: ICSA-101101C 7 Interference Check Sample A										05/25/11 10:27
Arsenic		0.000340	mg/L	0.0010						
Barium		0.000120	mg/L	0.0010						
Cadmium		0.00144	mg/L	0.0010						
Chromium		0.00134	mg/L	0.0010						
Lead		0.000150	mg/L	0.0010						
Selenium		0.000180	mg/L	0.0010						
Silver		0.000110	mg/L	0.0010						
Sample ID: QCS - 101221A, 10122 7 Initial Calibration Verification Standard										05/25/11 10:23
Arsenic		0.0504	mg/L	0.0010	101	90	110			
Barium		0.0496	mg/L	0.0010	99	90	110			
Cadmium		0.0259	mg/L	0.0010	104	90	110			
Chromium		0.0506	mg/L	0.0010	101	90	110			
Lead		0.0508	mg/L	0.0010	102	90	110			
Selenium		0.0525	mg/L	0.0010	105	90	110			
Silver		0.0254	mg/L	0.0010	102	90	110			
Method: SW6020										Batch: B_54249
Sample ID: LCSD-54249 7 Laboratory Control Sample Duplicate										Run: SUB-B166138
										05/25/11 23:47
Arsenic		0.491	mg/L	0.50	98	85	115	0.0	20	
Barium		5.58	mg/L	1.0	97	85	115	0.0	20	
Cadmium		0.250	mg/L	0.10	100	85	115	0.0	20	
Chromium		0.470	mg/L	0.50	92	85	115	0.0	20	
Lead		0.508	mg/L	0.50	101	85	115	0.0	20	
Selenium		0.466	mg/L	0.10	93	85	115	0.0	20	
Silver		0.0492	mg/L	0.50	97	85	115	0.0	20	
Sample ID: H11050271-002B 7 Sample Matrix Spike										Run: SUB-B166138
										05/26/11 00:12
Arsenic		0.507	mg/L	0.50	101	75	125			
Barium		6.00	mg/L	1.0	102	75	125			
Cadmium		0.263	mg/L	0.10	105	75	125			
Chromium		0.464	mg/L	0.50	91	75	125			
Lead		0.528	mg/L	0.50	105	75	125			
Selenium		0.466	mg/L	0.10	93	75	125			
Silver		0.0515	mg/L	0.50	103	75	125			

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.





www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

## QA/QC Summary Report

Prepared by Helena, MT Branch

Client: MT DEQ-Abandoned Mines

Report Date: 06/01/11

Project: Sand Coulee Cottonwood Clogged Streams

Work Order: H11050271

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: SW6020</b>										
<b>Sample ID: H11050271-011B</b> 7 Sample Matrix Spike Run: SUB-B166138 Batch: B_54249 05/26/11 01:05										
Arsenic		0.499	mg/L	0.50	100	75	125			
Barium		6.20	mg/L	1.0	98	75	125			
Cadmium		0.254	mg/L	0.10	101	75	125			
Chromium		0.470	mg/L	0.50	93	75	125			
Lead		0.518	mg/L	0.50	103	75	125			
Selenium		0.471	mg/L	0.10	94	75	125			
Silver		0.0492	mg/L	0.50	98	75	125			
<b>Sample ID: H11050271-010B</b> 7 Sample Matrix Spike Run: SUB-B166138 05/26/11 00:44										
Arsenic		0.484	mg/L	0.50	97	75	125			
Barium		5.88	mg/L	1.0	95	75	125			
Cadmium		0.253	mg/L	0.10	100	75	125			
Chromium		0.445	mg/L	0.50	87	75	125			
Lead		0.506	mg/L	0.50	101	75	125			
Selenium		0.457	mg/L	0.10	91	75	125			
Silver		0.0496	mg/L	0.50	99	75	125			
<b>Sample ID: H11050271-009B</b> 7 Sample Matrix Spike Run: SUB-B166138 05/26/11 00:40										
Arsenic		0.483	mg/L	0.50	97	75	125			
Barium		5.73	mg/L	1.0	95	75	125			
Cadmium		0.250	mg/L	0.10	100	75	125			
Chromium		0.451	mg/L	0.50	89	75	125			
Lead		0.508	mg/L	0.50	102	75	125			
Selenium		0.455	mg/L	0.10	91	75	125			
Silver		0.0491	mg/L	0.50	98	75	125			
<b>Sample ID: H11050271-008B</b> 7 Sample Matrix Spike Run: SUB-B166138 05/26/11 00:36										
Arsenic		0.478	mg/L	0.50	96	75	125			
Barium		5.68	mg/L	1.0	96	75	125			
Cadmium		0.250	mg/L	0.10	99	75	125			
Chromium		0.442	mg/L	0.50	86	75	125			
Lead		0.499	mg/L	0.50	100	75	125			
Selenium		0.453	mg/L	0.10	91	75	125			
Silver		0.0486	mg/L	0.50	97	75	125			
<b>Sample ID: H11050271-007B</b> 7 Sample Matrix Spike Run: SUB-B166138 05/26/11 00:32										
Arsenic		0.489	mg/L	0.50	98	75	125			
Barium		5.92	mg/L	1.0	99	75	125			
Cadmium		0.255	mg/L	0.10	102	75	125			
Chromium		0.450	mg/L	0.50	88	75	125			
Lead		0.510	mg/L	0.50	102	75	125			
Selenium		0.460	mg/L	0.10	92	75	125			
Silver		0.0507	mg/L	0.50	100	75	125			
<b>Sample ID: H11050271-006B</b> 7 Sample Matrix Spike Run: SUB-B166138 05/26/11 00:28										
Arsenic		0.495	mg/L	0.50	99	75	125			

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

## QA/QC Summary Report

Prepared by Helena, MT Branch

Client: MT DEQ-Abandoned Mines

Report Date: 06/01/11

Project: Sand Coulee Cottonwood Clogged Streams

Work Order: H11050271

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW6020										
Batch: B_54249										
Sample ID: H11050271-006B	7	Sample Matrix Spike				Run: SUB-B166138				05/26/11 00:28
Barium		6.62	mg/L	1.0	94	75	125			
Cadmium		0.272	mg/L	0.10	99	75	125			
Chromium		0.474	mg/L	0.50	92	75	125			
Lead		0.513	mg/L	0.50	102	75	125			
Selenium		0.470	mg/L	0.10	94	75	125			
Silver		0.0488	mg/L	0.50	98	75	125			
Sample ID: H11050271-005B	7	Sample Matrix Spike				Run: SUB-B166138				05/26/11 00:24
Arsenic		0.492	mg/L	0.50	98	75	125			
Barium		5.90	mg/L	1.0	97	75	125			
Cadmium		0.258	mg/L	0.10	100	75	125			
Chromium		0.467	mg/L	0.50	91	75	125			
Lead		0.512	mg/L	0.50	102	75	125			
Selenium		0.464	mg/L	0.10	93	75	125			
Silver		0.0491	mg/L	0.50	98	75	125			
Sample ID: B11051917-001ADIL	7	Serial Dilution				Run: SUB-B166138				05/25/11 23:39
Arsenic		0.0100	mg/L	0.50		0	0			10 N
Barium		1.59	mg/L	1.0		0	0	3.6		10
Cadmium		0.00700	mg/L	0.10		0	0			10 N
Chromium		0.00875	mg/L	0.50		0	0			10 N
Lead		0.00450	mg/L	0.50		0	0			10
Selenium		ND	mg/L	0.10		0	0			10
Silver		ND	mg/L	0.50		0	0			10
Sample ID: H11050271-003B	7	Sample Matrix Spike				Run: SUB-B166138				05/26/11 00:16
Arsenic		0.502	mg/L	0.50	101	75	125			
Barium		5.88	mg/L	1.0	101	75	125			
Cadmium		0.290	mg/L	0.10	105	75	125			
Chromium		0.459	mg/L	0.50	90	75	125			
Lead		0.520	mg/L	0.50	104	75	125			
Selenium		0.470	mg/L	0.10	93	75	125			
Silver		0.0506	mg/L	0.50	101	75	125			
Sample ID: H11050271-001B	7	Sample Matrix Spike				Run: SUB-B166138				05/26/11 00:08
Arsenic		0.488	mg/L	0.50	98	75	125			
Barium		5.94	mg/L	1.0	99	75	125			
Cadmium		0.256	mg/L	0.10	103	75	125			
Chromium		0.448	mg/L	0.50	88	75	125			
Lead		0.506	mg/L	0.50	101	75	125			
Selenium		0.453	mg/L	0.10	91	75	125			
Silver		0.0502	mg/L	0.50	100	75	125			
Sample ID: LCS-54249	7	Laboratory Control Sample				Run: SUB-B166138				05/25/11 23:43
Arsenic		0.491	mg/L	0.50	98	85	115			
Barium		5.63	mg/L	1.0	98	85	115			

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

N - The analyte concentration was not sufficiently high to calculate a RPD for the serial dilution test.



www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

## QA/QC Summary Report

Prepared by Helena, MT Branch

Client: MT DEQ-Abandoned Mines

Report Date: 06/01/11

Project: Sand Coulee Cottonwood Clogged Streams

Work Order: H11050271

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: SW6020</b>										
Batch: B_54249										
<b>Sample ID: LCS-54249</b>	7	Laboratory Control Sample				Run: SUB-B166138				05/25/11 23:43
Cadmium		0.253	mg/L	0.10	101	85	115			
Chromium		0.470	mg/L	0.50	92	85	115			
Lead		0.513	mg/L	0.50	102	85	115			
Selenium		0.466	mg/L	0.10	93	85	115			
Silver		0.0481	mg/L	0.50	94	85	115			
<b>Sample ID: MB-54249</b>	7	Method Blank				Run: SUB-B166138				05/25/11 22:25
Arsenic		ND	mg/L	0.001						
Barium		0.3	mg/L	0.0001						
Cadmium		ND	mg/L	0.0002						
Chromium		0.009	mg/L	0.0003						
Lead		0.0007	mg/L	5E-05						
Selenium		ND	mg/L	0.001						
Silver		0.0009	mg/L	8E-05						
<b>Sample ID: H11050271-004B</b>	7	Sample Matrix Spike				Run: SUB-B166138				05/26/11 00:20
Arsenic		0.484	mg/L	0.50	97	75	125			
Barium		5.68	mg/L	1.0	96	75	125			
Cadmium		0.253	mg/L	0.10	101	75	125			
Chromium		0.448	mg/L	0.50	88	75	125			
Lead		0.506	mg/L	0.50	101	75	125			
Selenium		0.455	mg/L	0.10	91	75	125			
Silver		0.0494	mg/L	0.50	99	75	125			

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.





www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

## QA/QC Summary Report

Prepared by Helena, MT Branch

Client: MT DEQ-Abandoned Mines

Report Date: 06/01/11

Project: Sand Coulee Cottonwood Clogged Streams

Work Order: H11050271

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW7470A										Analytical Run: SUB-B166264
Sample ID: QCS Initial Calibration Verification Standard										05/26/11 10:57
Mercury		0.0020	mg/L	0.0010	99	90	110			
Method: SW7470A										Batch: B_54248
Sample ID: H11050271-009B Sample Matrix Spike										Run: SUB-B166264 05/26/11 19:24
Mercury		0.011	mg/L	0.020	108	75	125			
Sample ID: H11050271-005B Sample Matrix Spike										Run: SUB-B166264 05/26/11 16:42
Mercury		0.012	mg/L	0.020	119	75	125			
Sample ID: H11050271-011B Sample Matrix Spike										Run: SUB-B166264 05/26/11 17:25
Mercury		0.011	mg/L	0.020	111	75	125			
Sample ID: H11050271-010B Sample Matrix Spike										Run: SUB-B166264 05/26/11 17:14
Mercury		0.012	mg/L	0.020	124	75	125			
Sample ID: H11050271-008B Sample Matrix Spike										Run: SUB-B166264 05/26/11 17:00
Mercury		0.011	mg/L	0.020	112	75	125			
Sample ID: H11050271-007B Sample Matrix Spike										Run: SUB-B166264 05/26/11 16:51
Mercury		0.012	mg/L	0.020	120	75	125			
Sample ID: H11050271-006B Sample Matrix Spike										Run: SUB-B166264 05/26/11 16:46
Mercury		0.012	mg/L	0.020	120	75	125			
Sample ID: MB-54248 Method Blank										Run: SUB-B166264 05/26/11 16:07
Mercury		ND	mg/L	0.0002						
Sample ID: H11050271-001B Sample Matrix Spike										Run: SUB-B166264 05/26/11 16:19
Mercury		0.012	mg/L	0.020	115	75	125			
Sample ID: LCS-54248 Laboratory Control Sample										Run: SUB-B166264 05/26/11 16:10
Mercury		0.011	mg/L	0.020	110	85	115			
Sample ID: LCSD-54248 Laboratory Control Sample										Run: SUB-B166264 05/26/11 16:12
Mercury		0.011	mg/L	0.020	114	85	115			
Sample ID: H11050271-001B Serial Dilution										Run: SUB-B166264 05/26/11 16:16
Mercury		ND	mg/L	0.020		0	0			10
Sample ID: H11050271-004B Sample Matrix Spike										Run: SUB-B166264 05/26/11 16:37
Mercury		0.011	mg/L	0.020	113	75	125			
Sample ID: H11050271-002B Sample Matrix Spike										Run: SUB-B166264 05/26/11 16:23
Mercury		0.011	mg/L	0.020	112	75	125			
Sample ID: H11050271-003B Sample Matrix Spike										Run: SUB-B166264 05/26/11 16:28
Mercury		0.0098	mg/L	0.020	98	75	125			

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

## QA/QC Summary Report

Prepared by Helena, MT Branch

Client: MT DEQ-Abandoned Mines

Report Date: 06/01/11

Project: Sand Coulee Cottonwood Clogged Streams

Work Order: H11050271

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW7471A										Analytical Run: HGCV201-H_110520A
Sample ID: ICV Initial Calibration Verification Standard										
Mercury		0.00097	mg/kg	0.50	97	90	110			05/20/11 11:13
Sample ID: CCV Continuing Calibration Verification Standard										
Mercury		0.0026	mg/kg	0.50	103	90	110			05/20/11 11:15
Sample ID: CCV Continuing Calibration Verification Standard										
Mercury		0.0025	mg/kg	0.50	101	90	110			05/20/11 11:53
Method: SW7471A										Batch: 12271
Sample ID: MB-12271 Method Blank										
Mercury		ND	mg/kg							Run: HGCV201-H_110520A 05/20/11 11:20
Sample ID: LCS-12271 Laboratory Control Sample										
Mercury		5.3	mg/kg	0.50	105	70	130			Run: HGCV201-H_110520A 05/20/11 11:22
Sample ID: H11050271-003AMS Sample Matrix Spike										
Mercury		0.54	mg/kg	0.50	103	85	115			Run: HGCV201-H_110520A 05/20/11 11:39
Sample ID: H11050271-003AMSD Sample Matrix Spike Duplicate										
Mercury		0.57	mg/kg	0.50	110	85	115	5.8		Run: HGCV201-H_110520A 05/20/11 11:41 30
Sample ID: H11050271-010AMS Sample Matrix Spike										
Mercury		0.48	mg/kg	0.50	96	85	115			Run: HGCV201-H_110520A 05/20/11 12:10
Sample ID: H11050271-010AMSD Sample Matrix Spike Duplicate										
Mercury		0.51	mg/kg	0.50	102	85	115			Run: HGCV201-H_110520A 05/20/11 12:12 30

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



www.energylab.com  
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515  
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

## Workorder Receipt Checklist



H11050271

Login completed by: Tracy L. Lorash

Date Received: 5/18/2011

Reviewed by: BL2000\sdull

Received by: TLL

Reviewed Date: 5/23/2011

Carrier Hand Del  
name:

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature:	8.8°C On Ice		
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Applicable <input checked="" type="checkbox"/>

Contact and Corrective Action Comments:

None

# **Appendix I**

DEQ Water Protection Bureau Correspondence



Montana Department of  
**ENVIRONMENTAL QUALITY**

Brian Schweitzer, Governor  
Richard H. Opper, Director

P.O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • [www.deq.mt.gov](http://www.deq.mt.gov)

February 9, 2012

Hayden Janssen  
Montana Dept of Environmental Quality, Abandoned Mine Lands  
PO Box 200901  
Helena MT 59620-0901

RE: Authorization No. **MTB009012** Short-Term Water Quality Standard for Turbidity Related  
to Construction Activity Pursuant to 75-5-318, MCA  
VALID June 1, 2012 through May 31, 2013.

Dear Mr. Janssen:

The Montana Department of Environmental Quality Water Protection Bureau has completed our review of your project for activity on **Sand Coulee Creek and tributaries (NW ¼, SE ¼, Section 36, T19N, R4E) in Cascade County**. This activity herewith is qualified for a temporary surface water quality turbidity standard if it is carried out in accordance with the following conditions:

- (1) Construction activities in or near the watercourse are to be limited to the minimum area necessary, and conducted so as to minimize increases in suspended solids and turbidity which may degrade water quality and damage aquatic life outside the immediate area of operation,
- (2) The use of machinery in the watercourse shall be avoided unless absolutely necessary. To prevent leaks of petroleum products into waterways, no defective equipment shall be operated in the watercourse or adjacent areas capable of contributing surface flow to the watercourse,
- (3) Precautions shall be taken to prevent spillage of any petroleum products, chemicals or other deleterious material in or near the watercourse, and no equipment shall be fueled or serviced in adjacent areas capable of contributing surface flow to the watercourse,
- (4) All disturbed areas on the streambank and adjacent areas created by the construction activity shall be protected with temporary erosion control during construction activities. These areas shall be reclaimed with appropriate erosion control measures and revegetated to provide long-term erosion control,
- (5) Any excess material generated from this project must be disposed of above the ordinary high water mark, not classified as a wetland, and in a position not to cause pollution to State waters,
- (6) Clearing of vegetation will be limited to that which is absolutely necessary for construction of the project,

RECEIVED

FEB 15 2012

Department of  
Environmental Quality  
Remediation Division

Enforcement Division • Permitting & Compliance Division • Planning, Prevention & Assistance Division • Remediation Division

Hayden Janssen  
February 9, 2012  
Page 2 of 2

- (7) The use of asphalt or petroleum-based products as riprap is strictly prohibited. Its use as fill material is also prohibited if it is placed in a location where it is likely to cause pollution of State waters,
- (8) This authorization does not authorize a point source surface water discharge. A MPDES permit is required for said discharge,
- (9) The applicant must conduct all activities in full and complete compliance with all terms and conditions of any permit for this activity issued pursuant to the Montana Natural Streambed and Land Preservation Act (310 permit) or the Montana Stream Protection Act (124 permit), and any valid Memorandum of Agreement and Authorization (MAA) negotiated for this activity, and
- (10) Precautions shall be taken to prevent spillage of any petroleum products, chemicals or other deleterious material in or near the watercourse, and no equipment shall be fueled or serviced in adjacent areas capable of contributing surface flow to the watercourse. A spill containment kit must be available at the work site.

Although, not a condition of this authorization, if possible, please provide a digital photo or two of the pre or post project site conditions to [jeryan@mt.gov](mailto:jeryan@mt.gov).

This authorization is valid for only the period noted. No authorization is valid for more than a one-year period of time.

Any violations of the conditions of this authorization may be subject to an enforcement action pursuant to the applicable provisions of the Montana Water Quality Act.

This authorization is granted pursuant to 75-5-318, MCA, and only applies to the activity described by your application. Any modification of the activity described in your application which may result in additional turbidity in the stream must receive prior approval from the Department. You may contact me at (406) 444-4626.

Sincerely,



Jeff Ryan  
Water Quality Specialist  
Water Protection Bureau  
e-mail [jeryan@mt.gov](mailto:jeryan@mt.gov)

## **Appendix J**

US Army Corps of Engineers Correspondence





REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
CORPS OF ENGINEERS, OMAHA DISTRICT  
MISSOULA REGULATORY OFFICE  
1600 NORTH AVENUE WEST, SUITE 105  
MISSOULA, MONTANA 59801-5500

November 7, 2011

Regulatory Branch  
Montana State Program  
Corps No. **NWO-2011-02121-MTM**

Subject: Montana Department of Environmental Quality, Abandoned Mine Lands Section Remediation -  
Sand Coulee Creek, Cottonwood Creek and Straight Creek

Montana Department of Environmental Quality  
Abandoned Mine Lands Program  
Attn: Hayden Janssen  
P.O. Box 200901  
Helena, Montana 59620-0901

Dear Mr. Janssen:

We have reviewed the Montana pre-application consultation submitted for mine remediation near the towns of Sand Coulee, Tracy and Stockett. The proposed work is located in Sections 12, 13, 25 and 36, Township 19 North, Range 4 East; Sections 19 and 30, Township 19 North, Range 5 East; and Section 1, Township 18 North, Range 4 East, in Cascade County, Montana.

Under the authority of Section 404 of the Clean Water Act, DA permits are required for the discharge of fill material into waters of the U.S. Waters of the U.S. include the area below the ordinary high water mark of stream channels and lakes or ponds connected to the tributary system, and wetlands adjacent to these waters. Isolated waters and wetlands, as well as man-made channels, may be waters of the U.S. in certain circumstances, which must be determined on a case-by-case basis. Cottonwood Creek is a relatively permanent waterway which terminates in Sand Coulee Creek. Sand Coulee Creek is a relatively permanent waterway which terminates in the Missouri River, a navigable water of the U.S. under DA jurisdiction.

Based on the information provided to this office by DOWL HKM, Inc. on October 28, 2011, the project involves the excavation of acid mine drainage precipitates in Cottonwood Creek, Sand Coulee Creek and their tributaries, and disposal of the material in an upland location and as not to erode into a waterway or wetland. Best Management Practices will be utilized to minimize sedimentation. The excavated material will be disposed of in an upland location and does not involve the installation of fill material in a water of the U.S., therefore, a DA permit is not required for this project. Modifications to the plans which include installation of fill material in a water of the US will require additional consultation with this office. This does not eliminate the requirement to obtain other applicable federal, state, tribal and local permits. DA permit information and applications are available at:  
<http://www.nwo.usace.army.mil/html/od-rmt/mthome.htm>.

RECEIVED

NOV 09 2011

Dept. of Environmental Quality  
Remediation Division

Printed on  Recycled Paper



A copy of this letter will be provided to Rick West, DOWL HKM, P.O. Box 49, Great Falls, MT 59403-0049. Please contact Amelia Gucker at (406) 541-4845, extension 325 and reference Corps File Number NWO-2011-02121-MTM if you have questions concerning this determination.

Sincerely,

A handwritten signature in blue ink, appearing to read "Todd N. Tillinger". The signature is fluid and cursive, with a large, stylized "T" and "N".

Todd N. Tillinger  
Montana Program Manager

## **Appendix K**

Montana Department of Transportation Permit

STATE OF MONTANA - DEPARTMENT OF TRANSPORTATION  
HELENA, MT 59620-1001  
ENCROACHMENT APPLICATION AND PERMIT

- To be filled in by Department of Transportation Personnel -

AGREEMENT NO.: \_\_\_\_\_ MAINTENANCE NO.: 31-01  
PROJECT NO.: \_\_\_\_\_ SIGN ROUTE: S-227  
PROJECT NAME: Stockett Mine Cleanup ID NUMBER: \_\_\_\_\_  
CORRIDOR: C-0002275 RB: \_\_\_\_\_ MP: 7.5  
COUNTY: Cascade

- To be filled in by Department of Transportation Personnel and the requesting Company -

MONTANA DEQ-ABANDONED MINES BUREAU COMPANY OR CORPORATION	April 16, 2012	<u>Tony F. Stagner</u>	<u>4/22/12</u>
Hayden Janssen-Reclamation Specialist TITLE	Date	MONTANA DEPARTMENT OF TRANSPORTATION <u>Maintenance chet</u>	Date
<u>[Signature]</u> SIGNATURE		<u>[Signature]</u> SIGNATURE	
Subject to the terms and conditions shown on Page 2 hereof, this permit is hereby approved and granted			

The "Permittee" agrees to the terms of this permit.

APPLICANT (PROPERTY OWNER)

APPLICATION FOR PERMISSION TO: Encroach upon the Right-of-Way along State Route 227 between Centerville and Stockett for the express purposes of reworking the ditch above and below a cross drain culvert under 227. This area is referred to as the "Guisti Ditch" in documents that have been supplied to MDT. The encroachment is anticipated to require closure of the west traffic lane for a short duration. This lane will not remain closed during night time hours and will thus not require flashing lights.

(Give sufficient detail to permit thorough understanding and submit blueprints or sketches in triplicate.)

\*If work involves Environmental-Related cleanup or monitoring, also complete Section 7.

Township Range Section  
19N 5E 19

- Name of Applicant: MONTANA DEQ-ABANDONED MINES BUREAU, contact Hayden Janssen-Reclamation Spec.
- Address of Applicant: 1100 N. LAST CHANCE GULCH, P.O. BOX 200901 HELENA, MT 59620-0901
- Applicant's Phone #: (406)841-5082 Fax #: (406)841-5024 Email: HJanssen@mt.gov
- If Applicant is a Corporation, give State of Incorporation and names of President and Secretary:  
n/a
- Highway survey stations, milepost, distances to centerline, and distance from right-of-way line (in metric units) near which installations or structures will be installed:  
MP 7.4 - Guisti Site
- For how long a period is the permit desired?: 60 days
- Nature of Permit: Encroachment
- Environmental actions involving hazardous waste sites? (Superfund, Spills, Underground Storage Tanks, Old Mines, etc.)

11/15/2010

1

# **Appendix L**

Cascade County Floodplain Permit Decision



## Cascade County Public Works Department



February 28, 2012

Hayden Janssen  
Department of Environmental Quality  
Remediation Division  
Abandoned Mines Bureau  
PO Box 200901  
Helena, MT 59620-0901

RE: Excavation project along Cottonwood Creek, Sand Coulee Creek, and Straight Creek

Dear Mr. Janssen:

Cascade County is waiving the need for a floodplain permit for the work on the clogged bridges, culverts and stream channel segments of Cottonwood Creek, Sand Coulee Creek and Straight Creek as described in the final project design report provided to us in December, 2011.

All other required County, State and Federal permits must be complied with. All excavated materials must be removed from the regulated floodplain and disposed of in accordance with all State and Federal regulations.

If you have any further questions, you may contact us at (406) 454-6905.

Sincerely,

Susan Conell,  
Cascade County Planning Director

C: Brian Clifton, Public Works Director, Cascade County

RECEIVED

FEB 29 2012

Dept. of Environmental Quality  
Remediation Division

Brian K. Clifton, Director

### DIVISIONS

<u>Building Maintenance</u>	<u>Fleet Maintenance</u>	<u>Planning</u>	<u>Road &amp; Bridge</u>	<u>Weed &amp; Mosquito</u>
Kerry Saunders	Bob Wilson	Susan Conell	Dave Sutton	Ryan Arkoudas
415 2 <sup>nd</sup> Ave No, #111	279 Vaughn S Frontage Rd	121 4 <sup>th</sup> St No, STE 2H/I	279 Vaughn S Frontage Rd	279 Vaughn S Frontage Rd
Great Falls, MT 59401	Great Falls, MT 59404	Great Falls, MT 59401	Great Falls, MT 59404	Great Falls, MT 59404
Phone: 406-454-6769	Phone: 406-454-6913	Phone: 406-454-6905	Phone: 406-454-6913	Phone: 406-454-6920
	Fax: 406-454-6910	Fax: 406-454-6919	Fax: 406-454-6910	Fax: 406-454-6922